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THE
Ophthalmic Review



THE
Ophthalmic Review

A RECORD OF OPHTHALMIC SCIENCE.

EDITED BY

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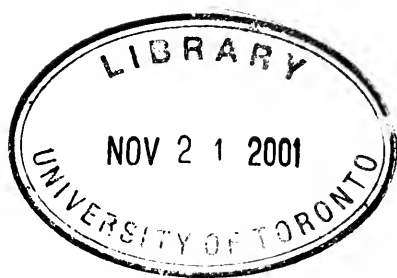
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THE PRESIDENT'S ADDRESS
TO THE
OPHTHALMOLOGICAL SOCIETY OF THE UNITED
KINGDOM.

By R. MARCUS GUNN, F.R.C.S.*

After thanking the members of the Society for the honour bestowed on him in electing him President, Mr. Gunn spoke of the early history of the Society. He quoted from a circular letter, dated February 1880, and headed *Proposed Ophthalmological Society*, some sentences suggesting that such a Society would be "the best means for fostering work, encouraging discussion, and facilitating publication in Ophthalmology," and expressing the hope that "by numbering among its members those who work at Ophthalmic subjects from many different points of view," they might "avoid degenerating into a mere Society of Oculists," and continued :—

Four months after this letter was issued, on the 23rd of June, 1880, the Ophthalmological Society of the United Kingdom was constituted at a meeting in this building presided over by William Bowman. The office-bearers were appointed at the meeting, and as you all know Bowman became our first President. In the letter calling this meeting, the names of fifty-one Ophthalmic Surgeons and Physicians appear who had already been enrolled as members.

I wish now to give a short review of the work of the Society since its constitution.

As examples of the important material brought before the first session of the Society and recorded in volume i of the *Transactions*, we find the following :—

"Symmetrical Changes in the Region of the Yellow Spot in each Eye of an Infant," by Waren Tay. This was the first observation of what is now known as Amaurotic Family Idiocy.

* Delivered at the opening meeting of the session, October 17th. 1907.

The President's Address

"The Relation of the Retinal Changes to the other Pathological Conditions of Bright's Disease," by William Brailey and Walter Edmunds.

"Two Cases of Retinal Detachment in Renal Retinitis," by Dyce Davidson and Dr. Quinlar respectively.

"On Primary Intraocular Hæmorrhage," by Jonathan Hutchinson.

"Retinal Hæmorrhages in Progressive Pernicious Anæmia," by Stephen Mackenzie.

"Cases of Symmetrical Amblyopia with Central Scotoma in Diabetes, with microscopical examination of the Optic Nerve," by Nettleship and Edmunds.

"On Eye Symptoms in Locomotor Ataxy," by Hughlings Jackson.

"On Ophthalmoplegia Interna," by Hulke, with a discussion, in which Gowers advanced the view of the cause of this affection being disease of part of the 3rd nerve nucleus.

Report of a Committee of the Society on Colour Blindness. And an important Discussion on the Relation between Optic Neuritis and Intracranial Disease, introduced by Hughlings Jackson.

It was a notable year's work, and is worth recalling as an instance of the vigour and broad aims of the young Society.

We are now entering upon our twenty-eighth year, and can look with some complacency on our accomplished work:—That the Society has given us the opportunity of meeting our fellow-workers, and of comparing our views on many topics of interest, and that it has afforded an easily available channel for recording cases will be readily conceded. But it has done much more than this—it has proved a stimulus to careful observation; through the exhibition of cases it has largely increased our individual experience; and, best of all, I think I can show that it

has been instrumental in the increase of medical knowledge and of the public weal.

The Society has held important discussions from time to time—not so many recently as one might have wished—in most of which we ophthalmic surgeons have had the benefit of the valuable co-operation of our medical fellow-members. Many of these discussions were not of temporary interest only, but have proved of permanent value. From among them I may mention the discussion on the Relation between Optic Neuritis and Intracranial Disease, already referred to; and those on Eye Symptoms in Diseases of the Spinal Cord; on Graves' Disease; on Toxic Amblyopia; and on Retro-ocular Neuritis. Two discussions only have been held on purely surgical matters, viz., on Sclerotomy, and on the Operative Treatment of High Myopia.

Special Committees of the Society have considered and reported upon several subjects of importance.

The first of these investigated the subject of Colour Blindness, and their report was instrumental in drawing attention to the prevalence of this condition among our population. One of the interesting points made out in the examinations conducted through this Committee was the relatively large number of deaf mutes who are colourblind.

The second considered the possibility of the prevention of Blindness from Ophthalmia neonatorum. It recommended *inter alia* that a card, containing simple information as to the early symptoms and the early danger of the disease, should be distributed to those in charge of newborn children among the poor. The Local Government Board in Ireland acted on this recommendation without delay, but the corresponding authority in England practically refused to adopt the suggestion, mainly on account of the adverse criticism of the Registrar-General. He argued that the registration officers would require extra pay for the work necessitated, that this would mean an increased annual expenditure of some £7,000, and that the

benefit would be confined to possible future children in the families thus notified. It would be instructive to know how many of these possible future children are now very actual men and women with damaged sight due to neglected ophthalmia neonatorum, and how much the annual public burden has been increased in consequence. Nevertheless, notwithstanding this reception by the Government, a certain amount of benefit has indirectly followed, even in England, from the attention drawn to the subject, particularly among those engaged in teaching midwifery.

A third Committee reported on the Action of the Vapours of carbon bisulphide and chloride of sulphur on the Sight and Health. Attention was by this means directed to the danger of imperfect ventilation and to the necessity of protection from the fumes of these substances in certain industries.

A fourth Report was the embodiment of much laborious work on Sympathetic Ophthalmitis, based on the experience of some 200 cases of this disease. Those of you who are familiar with the bulky appearance of volume vi of our *Transactions* are also aware how far this document is responsible. One of the facts shown in this analysis of cases was that sympathetic inflammation very rarely, if ever, occurs without a perforation of the coats of the exciting eye.

Another Committee reported on the Relative Value of Simple Excision of the Eyeball and the operations which have been substituted for it, while the last Report was in the form of a Memorial to the General Medical Council, advocating the desirability of making Ophthalmic Medicine and Surgery a compulsory part of the ordinary medical curriculum.

In reviewing our past work I would further ask you to note that the Society has been the medium through which professional attention was mainly directed to the momen-

tous significance of certain ophthalmoscopic appearances ("Albuminuric Retinitis," so-called) in Life Prognosis.

Mr. Gunn then mentioned the titles of many interesting papers appearing in the *Transactions*, as evidence of the value and variety of the communications brought before the Society.

Many other important communications were received besides those here mentioned, but enough have been cited to show how suggestive and useful not a few of the observations recorded in our *Transactions* have been to the profession of medicine in its widest sense, and how well we have steered clear of "that narrowness and that exclusiveness" which were dreaded by some critics "from the foundation of a separate special society." We have certainly not degenerated "into a mere society of oculists!"

But, gentlemen, art is long, and there is much for us to do. Our Society, notwithstanding these past years, is still in its youth, and has, I know, distributed among its members the energy, ability, and vitality which are necessary for our work, as it also certainly has the opportunities. More light, and *better, truer* light is required on many parts of ophthalmology. There are many ocular diseases whose true etiology is still imperfectly known, particularly perhaps some of those affecting the cornea, iris, and choroid.

We know very little regarding the real causation of partial or complete obstruction of the central retinal vein or its branches, although much suggestive pathological work on this subject has recently been done by Mr. Coats.

We still await the explanation of recurrent retinal hæmorrhages in eyes which are otherwise seemingly sound in persons whose general health is not manifestly at fault. Should the blood-state be proved to be abnormal in some of these cases, do not similar abnormalities not infrequently exist without the occurrence of hæmorrhage?

If so, what is the determining factor? If a diminished coagulability of the blood be found to exist, and this be increased and kept to the normal by appropriate remedies, we should expect to arrest the tendency to recurrences if they are due to this cause. Yet such treatment has hitherto, in my experience, proved disappointing. There is either something wrong in our explanation, or it is but a part of the cause, or there is something amiss in our exhibition of the remedy.

Again, opacities in the lens occasionally present forms which do not seem explicable either by our knowledge of its anatomy, or of its nutrition. Can these be accounted for?

Prognosis is a most important part of our duty to our patients, and is yet often very uncertain. It must, I presume, continue to be so until we are as the gods, but if we knew even a little more of the true nature of some of the more difficult diseases which we have to treat, our knowledge of their probable course and duration would be increased materially.

As to *treatment*, there is, I trust, also hope in the future. Within the past few years a great advance has been made in regard to the nature of infective agents and as to the manner in which the body attempts to combat their invasion, and strives to free itself from them and their effects. A new language has become necessary to express succinctly the facts observed and the theories founded upon these facts. We have the whole army of named bacteria and their toxins—combated by anti-toxines; we have bacteriolysins, hæmolysins, cytolymins; alexines, receptor, copula, toxophore, and haptophore; precipitins, agglutinins, opsonins—these are some of the words new to medical literature, and which we now have to learn and understand the meaning of, so as to appreciate the arguments on the beautiful scientific investigations which have been and are now being made in this connection. It is in youth that we learn a new language

and form fresh ideas most readily, and to some of us this newer teaching must necessarily be more difficult than it is to others, but we *must* know so much as to be able to follow intelligently the reasoning involved if serum and vaccine therapy are to be of use to us. If either is to be useful in ophthalmology, we must inquire in what cases it ought to be employed, and when, and, in the widest sense of the word, *how*.

Is there more to be learned concerning the influence of the secretion of the ductless glands upon the nutrition of the eyeball and orbit and upon the visual function?

Regarding medicinal treatment, I trust that our efforts may always be directed towards keeping our armamentarium as small and select as is possible without the sacrifice of efficiency. Too many drugs are a weariness to the flesh, both of him who gives, and of him who takes.

A considerable amount of experience has now been gained in this country as to the efficacy of treatment by sub-conjunctival injections. It would be interesting to know the opinion of our members on this subject, and it might be a proper subject for a Discussion or a Report by a Committee of the Society.

It might, indeed, be well to revert to more frequent Committees and Discussions as in the earlier years of our career.

In this connection I should like to refer to the very large number of card cases that are constantly being shown before the Society. Many of these cases are of exceptional interest and importance, yet I think you will agree with me when I say that we do not seem to be able to take full advantage of them. In fact, their very number is to some extent the cause of this inability, for we cannot see all, if, indeed, we can see any, satisfactorily in half an hour in a crowded room. The institution of clinical evenings was a decided advance, but I think there is much still to be desired. Would it not be possible to have standing Committees of the Society appointed

annually, each formed of men particularly interested in some branch of work—*e.g.*, congenital anomalies, external diseases, fundus lesions, pathological specimens—whose duty it would be to report upon any case, when the member showing it approved? Of any such committee the exhibitor would naturally form a member in the consideration of his own case. I think, perhaps, that in this way valuable results might accrue. I believe that it would be an advantage to those on the Committees, to those showing the cases, and to the Society at large.

A REPORT OF THE COMPARATIVE ACTION OF HOMATROPINE METHYL BROMIDE AND HOMATROPINE BROMIDE AS A MYDRIATIC.

By RAYNER D. BATTEN, M.D.,

Surgeon to Western Ophthalmic Hospital, London.

I HAVE made a short series of experiments on the comparative action of Homatropine Methyl Bromide and Homatropine Bromide with a view to testing the action of the former as a mydriatic on the pupil.

The chief points to be determined were:—

1. Its *rapidity* as a dilator.
2. The *duration* of the dilatation.

In some preliminary experiments made by Mr. H. H. Dale on cats, it was found that H.M.B. acted more quickly than H.B. in producing full dilatation. He reports: "Taking the average of seven experiments with 0·5 per cent. solution of each compound, the time for commencement of dilatation was 7·2 min. for the Methobromide and 13·4 for the Homatropine, and the time for the maximal dilatation was 29·4 min. for the Methobromide and 59·6 for Homatropine. Also, the dilatation produced by an instillation of the Methobromide was observed to be greater than that produced by the same amount of Homatropine; but one

experiment appeared to show that the former is not quite twice as active as the latter for the cat's eye.

"In these experiments attention was chiefly paid to the rapidity of onset of the dilatation. But from the general observations it was concluded that, with doses which would produce equivalent dilatation, the effect of the Methobromide would pass off, as well as appear, more quickly than the effect of Homatropine."

This superiority I did not find to be maintained in the human eye. The promptitude of the dilatation with H.M.B. was, if anything, rather less than with H.B. in 1 per cent. solutions; but with 2 per cent. solutions there was little, if any, difference between them.

I have made two classes of experiments: one in which I have applied the drug to *one* eye, leaving the other untouched, as a control; and a second, in which I have tried the comparative action of the two drugs, one being applied to each eye.

1. H.M.B. in a 1 per cent. solution produces nearly full dilatation in times varying from 30 minutes to 1 hour. Its action in this strength is not so prompt as that of H.B., but in a 2 per cent. solution its action is fully as rapid.

2. The full dilatation with H.M.B. lasts from 2—4 hours, after which it passes off with far greater rapidity than is the case with H.B., the full dilatation of the latter often lasting 10—12 hours, and then only passing off gradually, the pupil not returning to the normal for from 36—48 hours; whereas, with H.M.B. the dilatation often passes off completely, with a 1 per cent. solution in 5—9 hours, or with a 2 per cent. solution in about 16 hours.

In testing the comparative action of the two drugs, when I applied them to the two eyes at the same time it was interesting to note that the dilatation of the one eye with H.B. generally delayed the return to normal in the H.M.B. eye by some hours. In one case, however, the effort to overcome the dilatation appeared to stimulate the power of contraction in the other eye, so that it was smaller than its usual normal.

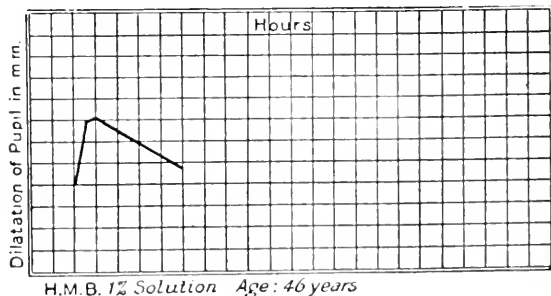
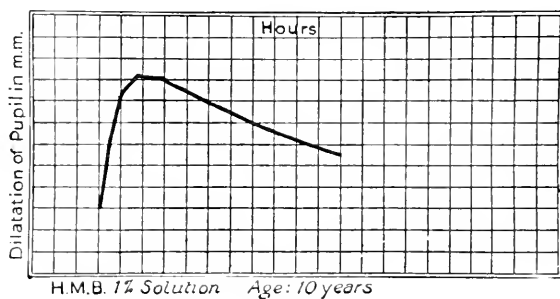
Homatropine Methyl Bromide

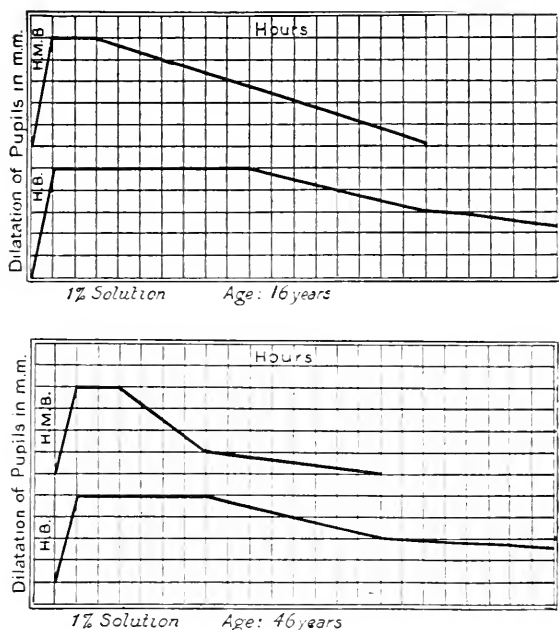
The inconvenience caused to the patient by the use of H.M.B. is, therefore, far less than that caused by H.B., and in some patients begins to pass off in less than three hours.

In young patients the dilatation lasts considerably longer than in adult or elderly people.

Messrs. Burroughs, Wellcome & Co., who furnished me with a supply of the drug, report that "the substance is an addition compound of Methylbromide and Homatropine, being thus a quaternary ammonium base."

The diagrams represent the curves showing the comparative action of the two drugs, the vertical divisions representing the dilatation of the pupil in mm., and the horizontal divisions indicating the time in hours.





REVIEWS.

VAN DUYSE. *Retinitis Punctata Albescens: Three Cases in One Family.* *Archives d'Ophthalmologie*, August, 1907.

IN this paper Van Duyse gives a detailed report of three examples of typical retinitis punctata albescens, with two coloured drawings, which are, so far as the reviewer is aware, the best published representations of the ophthalmoscopic appearances of this disease.

The family in which these cases occurred consisted of six living children—three males, three females—the offspring of healthy parents, both of whom were free from ocular disease. Four children died in infancy from “broncho-pneumonia,” “croup,” “dropsy”; there were no miscarriages. The first (female), fourth and sixth (males) of the family were affected; the other three (examined by the writer) were free from signs or symptoms of retinal disease.

In all three patients night blindness was an early and very marked symptom, and the degree of amblyopia was unusually high.

CASE I. Female, æt. 20, healthy. Can count fingers, with each eye, at 3 metres. Field of vision in good daylight contracted, more in upper part. Night blindness very pronounced; from the age of two years the patient has been unable to go about in the dark. Light sense so low that it cannot be measured on Förster's photometer. A 2 cm. blue square recognised in the centre of the perimeter; no other colours recognised.

Hair black, irides brown, pupils, in a good illumination, 4.5 mm.. Slight horizontal nystagmus.

The drawings were made from this patient, and the author gives a full description of the ophthalmoscopic appearances of the fundus of each eye.

The following is a much shortened account, omitting minute differences observed in the right and left eye:—Optic disc yellowish, with a slight pink tinge; temporal margin defined, other margins indistinct. Retinal arteries diminished in calibre, veins probably normal. The fundus generally has a mottled appearance, and owing to the large amount of choroidal pigment the retina appears greyish around the papilla and for some distance below it. The essential features of the disease, the white spots, might escape notice on examination by the indirect method, except towards the periphery of the ophthalmoscopic field, but by the direct method they are very obvious. They appear as innumerable minute white spots, with a fairly sharp outline, often closely set and sometimes in groups like bunches of grapes. Near the papilla, especially above it, they are very numerous, and so closely placed that they appear to coalesce. More peripherally they are less numerous and distinctly punctate. Retinal vessels pass in front of the spots; the latter are seen in front of choroidal vessels and in front of spaces between the choroidal vessels. In close relation to some of the large choroidal vessels are seen a few yellow rather lustrous spots about the diameter of the retinal veins, differing markedly in size and appearance from the minute white spots in the retina.

CASE II. Male, æt. 12; in an institution for the blind. Complexion, colour of hair and irides similar to his sister's. Night blindness noticed when 3 to 4 years of age. Field of

vision greatly contracted, in the better eye being nowhere more than 10° from the fixation point. Counts fingers, in daylight, at 2 metres; in the light of a lamp of 14 candle-power, the patient could not count fingers at 30 cm. Light sense could not be measured.

The ophthalmoscopic appearances were essentially those described in Case i., but the white spots in the retina were decidedly more minute, and were scarcely distinguishable in the inverted image.

CASE III. Male, æt. 5; in the same institution for the blind. Brown hair.

Night blindness very pronounced, and noticed as soon as the child began to walk. Field of vision much restricted. Horizontal nystagmus.

Appearances of the fundi similar to those of Case i.

There was no history of inheritance of the disease, and no consanguinity in the parents of the patients seen by Van Duyse.

The literature concerning retinitis punctata albescens is not extensive. Van Duyse gives references to eleven writers on the subject, beginning with Mooren, who first described the disease in 1882. No pathological examination has been made, and all statements as to the changes underlying the ophthalmoscopic appearances are deductions from clinical observation. As to the position of the white spots considerable divergence of opinion exists, at least in print. They have been, hypothetically, placed in the inner layers of the retina on a level with the vessels of this tunic, in the deep layers of the retina, in the retinal epithelium, on the *lamina vitrea* of the choroid, and in the *chorio-capillaris*.

The etiology of the disease, except in so far as heredity is a causative factor, remains unexplained.

J. B. L.

DI SANTO. **Melanotic Sarcoma of the Optic Nerve.**
Bollettino dell'Ospedale oftalmico della provincia di Roma,
1907, 10.

TUMOURS of the optic nerve are rare at any time, but even more rare must be the occurrence of pigmented sarcoma. Dr. di Santo describes the case of a girl of 9, who came before him first in

1904 with the left eye slightly exophthalmic, the protrusion being directly forwards, but otherwise showing no symptoms of moment. There was free movement of the eye, the pupillary reaction was intact, vision was normal, and the only fault which could be found ophthalmoscopically was slight hyperæmia of the disc with turgescence of the veins of the retina. Elastic resistance prevented the globe from being pushed back into the orbit, and on careful palpation a mass could be felt behind the globe, enclosed within the cone of muscles. A proximal diagnosis was made of tumour of the optic nerve, but no active steps were taken at that time. Ten months later the objective signs, and the symptoms as well, had become more obvious. The proptosis was more marked than it had been, but still the line of protrusion was straight forwards; movements were still unimpeded, and a mass could more distinctly be felt in the depths of the orbit. Neuritis was now quite evident; vision, however, was still unimpaired. The patient refused to submit to operation till some months later, when all the symptoms were greatly aggravated, the eye being greatly protruded and the movements much restricted, especially in a downward direction and outwards. There was reddening of the conjunctiva below from the inability of the lids to cover the globe; vision was gone, and the fundus showed neuritis in the stage of resolution. The author attacked the tumour by division of the internal rectus and turning the globe aside, but on isolating the tumour and dividing the nerve between it and the globe, he found that the tissue within the nerve sheath was already invaded by the tumour: he accordingly gave up all endeavours to save the eye, but enucleated it and cleared out the tumour to the apex of the orbit. The patient made a rapid recovery.

The capsule of the tumour was found to vary a good deal in thickness, and was invaded by fibrous and sarcomatous elements. A concentric bundle type of arrangement of cells was manifest in the growth itself, particularly towards the periphery, where hyaline degeneration was going on. Pigmentation was also most marked peripherally, just under the capsule, forming in parts a pigment layer, one might almost call it. The nerve tissue was greatly compressed, and the only sheath which could really be identified was the pial. The trabecular tissue which normally divides the bundles of nerve fibres was, however, well preserved.

W. G. S.

CAMILLE FROMAGET. **Non-Diphtheritic Ophthalmia Treated Successfully by means of Anti-Diphtheritic Serum.**
Annales d'Oculistique, September, 1907.

ANTI-DIPHTHERITIC serum has proved very beneficial, says Fromaget, in a number of cases of infection of the cornea by pneumococcus; indeed, the results have been brilliant, and this fact has induced him to treat a few cases of severe pneumococcus conjunctivitis in the same manner. In regard to this matter two facts, well-known to all who have studied the subject bacteriologically, stand out as of great importance: the facts, namely, that pneumococcus infection may take various forms and may be of any degree of severity, and that on the strength of the clinical aspect alone one is not justified in assuming the presence of any particular organism. This statement will be received with more or less acceptance by most observers.

He proceeds to relate the history in each of two cases of pseudo-membranous, pneumococcal inflammation of conjunctiva of great severity, in which the value of serum treatment was very manifest.

The first case was that of a boy of three, brought to him on account of a very severe double ophthalmia. There was enormous œdema of both upper lids and copious secretion of pus welling out from the canthus. When the eyes were examined the conjunctiva was found to be covered with false membrane, but the cornea was as yet unaffected by this. Free lavage with permanganate of potash was at once instituted, argyrol being employed at the same time, but as there was no amelioration of the condition after a few days, the patient was given an injection of anti-diphtheritic serum. The next day the false membranes had more than begun to separate off, and in forty-eight hours they had entirely cleared away, and the pus formation had ceased. The good result was maintained. The author, in view especially of the extremely rapid and beneficial action of the serum, and having regard to the clinical appearances, had entertained no doubt that the case was one of true diphtheritic conjunctivitis, but bacteriological examination showed conclusively (?) that the pathogenic organism was the pneumococcus.

The second case was that of a new-born child, attacked three days after birth by purulent ophthalmia. There was a considerable degree of tumefaction of the eyelids, from which

citron-yellow pus escaped in quantity: on the conjunctiva lay a grayish, firmly adherent membrane. Although the corneae were still intact, Fromaget could not in the circumstances regard the case as other than very grave. The best chance would be given, he considered, by an injection of anti-diphtheritic serum, which was accordingly administered. During the night following, most unfortunately, the lower portion of each cornea became involved. Notwithstanding this, the improvement in the state of the eyes was both immediate and highly gratifying. The membranes within forty-eight hours absolutely disappeared, the pus formation ceased, the œdema of the lids gradually vanished. The ulcers of the corneæ, though most alarming at first, healed well without further spread in extent or depth, and in a very short time the child was entirely well save for a faint leucoma. The only organisms found microscopically were pneumococcus and staphylococcus.

It appears then as though injection of the serum in these two cases (and no doubt the same would be found true in others also) had the effect of enabling the tissues to cast out the organisms, although the serum employed was not the specific one of the particular invading organism. As results not dissimilar have been observed with anti-tetanic serum, can it be that this is a quality of the serum of the horse, even when not immunised? The suggestion opens up great possibilities. At all events the treatment is one free from any serious danger, and Fromaget is to be congratulated on his success.

W. G. S.

ERDMANN. **Experimental Glaucoma.** *Graefe's Archiv*, xvi., 2 and 3.

NUMEROUS as have been the attempts to produce glaucoma artificially in animals the results have hitherto been very small. The various methods which previous experimenters have employed may be classified as follows:—

1. Ligaturing the vortex veins.
2. Ligaturing the optic nerve.

Both these procedures were entirely unsuccessful.

The following methods are more rational, in that their principle is to prevent drainage of fluid from the angle of the anterior chamber by causing iritic adhesions:—

3. Excising a piece of cornea and so causing complete anterior synechia.

4. Exciting plastic iritis and so causing complete posterior synechia.

These methods did indeed give rise to increase of intra-ocular tension for a time, but their effect on the nutrition of the eye was in almost all cases more profound than their authors intended, and instead of a typical glaucoma being produced, the result in most cases was phthisis bulbi.

In the succeeding methods an endeavour is made to block the angle of the anterior chamber by attacking it directly, either from within or from without.

5. The injection of chemical substances calculated to set up an adhesive inflammation at the angle of the anterior chamber, —aided in some experiments by the mechanical scratching of the endothelium of that angle with a needle.

6. Obliteration of the anterior ciliary veins by circular cauterisation of conjunctiva and sclera, or by subconjunctival injection of irritating solutions.

The results of these methods also proved very uncertain owing to the difficulty of arresting the degenerative processes that followed the glaucomatous stage. On the whole the most definite results hitherto obtained have been those of Bentzen, who adopted the fifth method, that of attacking the angle of the anterior chamber directly from within, and it is a development of this method of which Erdmann gives an account in these papers.

His procedure was based on the accidental observation, made during experiments on the decomposition of the aqueous by means of electrolysis, in the eye of the live rabbit, that the introduction of a positive electrode of steel into the anterior chamber was followed by enlargement of the globe and excavation of the papilla. The electrolysis had caused decomposition of the sodium chloride in the aqueous, partial solution of the positive electrode, and subsequent deposition of the iron in the form of fine granules in the adjacent tissues. These granules excited a proliferative inflammation, which led in time to the obliteration of the angle of the anterior chamber. The inflammation, however, was not confined to the angle, but involved both cornea and conjunctiva. In the anterior chamber the deposit of iron particles was found together with a number of leucocytes and small phagocytes. The endothelium lining the spaces of Fontana showed great proliferation, and this was present not only in those parts

where the iron had been deposited, but all round the circumference.

The strength of current found most suitable for these experiments was between 2 and 10 milliampères, applied for periods of from 1 to 3 minutes. Stronger currents for a longer time gave rise to more extensive inflammation, resulting not in glaucoma but in phthisis bulbi.

Another series of experiments consisted in first abstracting the aqueous, then submitting it to electrolysis with a positive steel electrode, and finally injecting the particles of oxidised steel so obtained with the aqueous of the same or of another rabbit. Between the second and the fifth day—generally the fourth—pericorneal injection, corneal swelling, iritic hyperæmia and plus tension,—in fact a typical acute secondary glaucoma—was generally the result. This method was found more successful than the former, as out of 32 rabbits experimented on, 24, or three-quarters, developed glaucoma. The acute stage was succeeded in from 3 to 6 weeks by the clearing of the cornea and pericorneal injection and the gradual enlargement of the globe caused by the adhesion of the root of the iris to the sclero-corneal junction. It is noteworthy that though iron was certainly present in these eyes, none of them developed symptoms of siderosis bulbi while under observation.

Experiments were also made with copper, zinc and silver as the positive electrode, but these metals were found less suitable for the purpose than iron, as the reaction produced by them was generally too great. The process of electrolysis does not seem to be essential, however, to the success of the experiment, as similar results were obtained by the injection of a suspension of iron particles kept in prolonged contact with physiological salt solution.

Although the result of all these experiments, when successful, was to obliterate the angle of the anterior chamber and so to produce a condition of permanently raised tension in the globe, the sequel was not a typically glaucomatous eye such as we understand it in the human adult, but rather a buphthalmic eye such as occurs in congenital glaucoma, and the pathological changes which were found were almost identical with those not of typical glaucoma, but of buphthalmos. This is of course explained by the fact that the sclera in the rabbit's eye is not resistant like that of the human adult, but to a certain extent distensible like that of the child. In all cases when the experiments were successful, the sclera was found to be thinned,

more in its anterior part, less in its posterior. In some cases the thinning had gone on to a ciliary staphyloma. Not only the sclera but the cornea became enlarged, especially in its vertical diameter. Atrophic changes in the choroid and retina corresponding to the stretching of the sclera were always found, and in all cases where the period of plus tension had exceeded one month the physiological optic cup was both deepened and widened. Descemet's membrane was in many cases divided into two layers, the inner one being apparently the result of proliferative inflammation. In other cases it showed linear tears like those observed clinically in buphthalmos.

Two further series of experiments were undertaken. The first was concerned with the respective effects of atropin and eserine on eyes rendered glaucomatous artificially. These effects were strictly analogous to the effects of these drugs when used on human glaucomatous eyes. The last series of experiments had to do with the secretory conditions existing in the eyes experimented upon. It was found that a solution of fluorescein injected into a vein appeared more quickly in the aqueous of the eye rendered artificially glaucomatous than in that of its fellow or normal eye. Further, it was found that the aqueous of the experimented eye was richer in albumen than its fellow. On the other hand, experiments undertaken to show whether the aqueous of the glaucomatous eye was richer in hæmolysin than that of its fellow nine days after the intraperitoneal injection of fresh defibrinated calf's blood, had a negative result.

A. H. T.

RUHWANDL. A Contribution to the Study of Lamellar Cataract. *Zeitschrift für Augenheilkunde*, xviii., 5 and 6.

THESE articles are based on the examination of ten lenses from six subjects of lamellar cataract varying in age from 8 to 54. The appearances described confirm in the main our knowledge already established by previous workers in this department, including Schirmer, Hess, Treacher Collins and Lawford. The diameter of the nucleus was found to vary between $2\frac{1}{2}$ and $3\frac{1}{2}$ mm., which, of course, is considerably smaller than the diameter of the lens at birth. In all but two cases the nucleus was found to contain spots similar to those described by previous observers and generally thought to be holes. In two, however, no such spots could be seen. The perinuclear zone,

where the greatest amount of opacity usually occurs, varied in thickness in these cases between 4μ and 0.1 mm., and the microscopic appearances did not, in the opinion of the author, tend to confirm the theory widely held that this zone is due to shrinking of the nucleus. The cortical zone showed very varying appearances, being in some cases normal, in others showing "outriders" continuous with opacities in the intermediate zone and the nucleus.

Two theories of the causation of lamellar cataract are still held, one that it is due to a developmental defect, the other that it is the result of defective nutrition during the first few years of life. The main difficulty about the latter theory is that the diameter of the lens at birth is considerably greater than that of the perinuclear zone in which the bulk of the opacities in lamellar cataract are usually found. Hence, if the opacities are due to any post-natal cause it must be one that can injure not only fibres in course of formation, but fibres which are already formed, or else such a cause as would involve a great shrinking of the lens nucleus. Ruhwandl, as has been mentioned, is inclined to reject the theory of shrinking as untenable and to fall back on the first theory, that the defect is developmental. In support of it he instances the fact that in a number of cases lamellar cataract is hereditary, and in a number of others is associated with other defects which are without doubt developmental. Moreover, there are a number of persons with normal sight in whom vacuoles in the lens exist, which vacuoles only differ in degree, not in kind, he maintains, from those existing in lamellar cataract. The argument that lamellar cataract is not usually discovered until after in the stage of infancy is no proof at all that it did not exist at birth: considerable defects in sight are often not noticed before school age. Moreover, it is not uncommon for the opacity of a lamellar cataract to increase while under observation. On the other hand—and this is a side of the subject to which Ruhwandl does not refer—the association of the condition with defects in the enamel of the permanent teeth seems to tell in favour of lamellar cataract having a post-natal origin (*cf.* Norman Bennett's paper at the Ophthalmological Society in 1900, and Treacher Collins's remarks thereon).* Is it not possible that some cases may have an intra-uterine and others a post-natal origin?

A. H. T.

* *Ophthal. Review*, Vol. xix., p. 357.

PROF. V. HIPPEL. **On the Value of Iridectomy in Glaucoma Simplex.** *Klinische Monatsblätter für Augenheilkunde*, July, 1907.

IN this paper strong evidence is brought forward in favour of the beneficial effect of iridectomy in simple glaucoma. V. Hippel upholds the generally accepted opinion that this operation is not only justifiable, but that the ophthalmic surgeon is bound to recommend it, and to give his patients the benefit of the only treatment which, in his opinion, is calculated to restrain the progress of the disease. Ophthalmic surgeons, however, do not all agree on this point. De Wecker obtained the opinions of 120 experienced operators, and found that nine-tenths favoured, while one-tenth opposed the operation; but Pechin, after a similar investigation, came to the opposite conclusion, namely, that the majority of operators considered it of little or no use. Both he and Schleich believe that the only treatment of any avail is the regular use of miotics. Schleich mentions that all statistics of operative treatment in simple glaucoma become more and more unfavourable in proportion to the length of time during which the cases are under observation.

The evidence v. Hippel brings forward is altogether in favour of iridectomy, and he considers that it distinctly retards the progress of the disease. In his clinic 41 per cent. of the cases operated upon showed no aggravation of symptoms after two years; 20 per cent. showed none after five years; 14 per cent. after ten years; and 9 per cent. after fourteen years.

Von Hippel points out that these favourable cases were not all operated on in the early stages of glaucoma, but that many had markedly contracted fields and pronounced cupping of the disc. He also states that in no case was the acuity of vision diminished by the operation. He condemns the use of miotics before operation if it leads to any delay, but thinks the iridectomy should be done as soon as the disease is diagnosed. Miotics, on the other hand, should be used regularly and continuously after operation. Sclerotomy also, the writer maintains, ought never to be employed as a substitute for iridectomy, but should be reserved for a secondary operation in case the tension rises after iridectomy. Even in advanced cases of simple glaucoma he considers that iridectomy should be performed, and that even then it tends to defer the advent of blindness.

CHARLES BLAIR.

SEGELKEN (Stendal). **Morphia-Scopolamine Narcosis in Ophthalmic Surgery.** *Klinische Monatsblätter für Augenheilkunde*, July, 1907.

THE suggestion to use subcutaneous injections of morphia combined with scopolamine in surgical operations was first made by Schneiderlin in 1900; but it was apparently not till 1905 that it was first proposed, or at any rate used, in ophthalmic surgery. Segelken in his paper strongly urges its more extended use in eye operations, and considers it, when used in the way he describes, to be absolutely free from danger. The preparation he uses is supplied by Riedel, of Berlin, under the patented name of "Scopomorphin," in sealed and sterilised ampoules. Each of these contains:—

Scopolamine Hydrobromide, gr. $\frac{1}{50}$.
Morphia Hydrochloride, gr. $\frac{1}{2}$.
Distilled Water, 30 minims.

Before employing the above the writer advises that the patient should have a quantity of fluid. Then about three hours before the operation one-third of the above solution is injected, and an hour and a half later one-third more. After the first injection the patient becomes drowsy, but after the second passes into a sound sleep. Very rarely is it necessary to inject the remaining third of the drug.

As soon as the patient is in a deep sleep the operation may be proceeded with, after the instillation of cocain. The patient does not wake up during the operation, but sleeps on for several hours. There is generally no vomiting or other after effects, and the patient has no recollection or consciousness of having been operated on.

The writer gives an example of a patient 64 years of age, who was admitted to his clinic with double acute glaucoma. Under "Scopomorphin" injection she had iridectomy performed in both eyes with perfect ease and without waking up, and continued to sleep for seven hours after. In this case a general anæsthetic was contraindicated in consequence of a tendency to profuse hæmaturia.

The results of this method have proved so satisfactory during Segelken's four years' experience of it that he is anxious to see its use greatly extended. He now always uses "Scopomorphin" injections in place of general anæsthesia, except in children under 13 years of age.

CHARLES BLAIR.

FAGE. **Luxation of the Globe during Birth.** *Archives d'Ophthalmologie*, August, 1907.

COMPLETE luxation of the globe is very rare, and is usually due to rough or unskilful use of forceps in difficult labour. Bock relates a case in which the accoucheur, mistaking a face for a breech presentation, thrust his finger into the eye of the child instead of the anus. The globe was replaced, but pan-ophthalmitis followed. Cases in which luxation occurs, apart from operative interference, are still more uncommon, but Hoffman saw a case in which the optic nerve was cut and luxation occurred as the result of the frontal bone having been fractured by the pressure of the promontory in a case of contracted pelvis.

Fage's case, related in this article, is somewhat similar to Hoffman's. He saw the child when three days old: the left eye was completely separated from the orbital cavity and lay on a thick layer of oedematous cellular tissue surrounded by chemotic conjunctiva. The lids and narrow palpebral aperture were seen behind. The cornea was dry and ulcerating, and the epithelium completely shed. The globe was firmly fixed by the muscles. There was no growth or collection of fluid behind the eye.

In seeking to account for the lesion Fage found that the mother had received a blow in the lower part of the abdomen by a cart shaft the day before delivery, and came to the conclusion that the head, owing to the shock and fall, had been forcibly compressed against the rigid pelvic walls causing a depression of the orbital parietes and expulsion of the globe.

Fage decided to attempt reduction. The external commissure was freely divided, the globe and tissues reduced and the eyelids stitched together (complete tarsorrhaphy). The result was most satisfactory. At the end of six months the eye was in a good position and freely movable in all directions. There was a dense corneal leucoma, and some depression of the lower orbital margin, but the latter was not visible to inspection.

J. BURDON-COOPER.

LAFON. **A Case of Double Microphthalmos** (A Contribution to the Study of the Rosettes of Wintersteiner). *Archives d'Ophthalmologie*, August, 1907.

LAFON has recently observed a case of double microphthalmos in which numerous developmental troubles, especially of the deeper membranes of the eye were present. Histologically the lesions proved of extreme interest, and especially so in connection with the natural history of retinal tumours.

At birth the eyelids were found tightly closed and their free edges everted. The eyeballs were small and deeply situated in the orbit. The conjunctival sac formed an actual cavity, at the bottom of which the cornea appeared as a black point surrounded by an opaque ring resembling arcus senilis. The child died two days after birth.

The tissues were fixed *in situ* by compresses of 10 per cent. formalin, and exenteration of the orbits was performed seven hours after death. The globes were found so firmly attached to the apex of the orbit by the short optic nerves that it was impossible to enucleate. The orbits were normal, and there was no indication of any cyst. The lower lids were normal in form, but in the upper the tarsus was bent upon itself at an acute angle. Beyond some cystic dilatations of the meibomian acini the tissues of the lids were normal.

The globes measured 8 mm. in antero-posterior diameter, as against a normal of 17 mm., and the vertical diameter of the cornea was 3 mm. instead of 10 mm. These figures would correspond with a development of about $4\frac{1}{2}$ months.

Histologically the cornea showed no signs of inflammation, but below Bowman's membrane in the peripheral zone there was a layer of capillary blood-vessels continuous with those of the sclerotic. The vessels were quite normal, and there was no cellular infiltration.

Lafon believes, with the majority of observers, that the annular congenital opacities which occur in the cornea are due to an arrest of development. Kölliker has, in fact, shown that the process of differentiation by which the cornea is rendered transparent only commences at the end of the fourth month, and progresses from the centre towards the periphery.

In the lens the cubical epithelium of the anterior surface was found also on the posterior, and it was impossible to differentiate between the two. The lens fibres were developed normally, but the lens itself participated in the arrest of

development. The measurements were slightly below those given by Treacher Collins for a fœtus of four months. The right lens was in a state of complete cataract. In the left the degeneration affected the peripheral fibres principally, and was especially pronounced at the poles. The tunica vaculosa was present in front of the lens, behind it was represented only by vessels in a mass of connective-tissue. The iris was absent in the right eye; it was present in the left, but there existed numerous anastomoses between its vessels and those of the posterior capsule, by which it seemed to have been drawn backwards, for the pupillary membrane existed, but lay behind the lens (as in an analogous case recently published by Fleischner). The retina formed a cone, with its apex at the optic nerve and its base at the pupillary margin of the iris, its relations indicating that it had never occupied its normal position, as if this had been the case, and it had become subsequently detached, the detachment would have been arrested at the ora serrata. The ciliary processes were undeveloped in both eyes, the pigment epithelium lining the choroid regularly without the slightest fold: while, on the other hand, the proximal retinal layer formed a veritable mucous gland, at certain points assuming the dimensions of a tubular adenoma, a condition which Lafon regards as confirming the views of those who look on the ciliary body as possessing definite secretory functions.

Another interesting point touched upon by Lafon, and one on which opinion is divided, is the origin of the proximal layer of cells of the pars ciliaris retinæ. Some observers think that all the layers of the retina are there represented, and others again incline to the view that it is the continuation only of the internal granular layer. In Lafon's case the internal and external granular layers were found to fuse and give rise to the proximal layer of the pars ciliaris.

In the right eye in the anterior part of the retinal cone there were spaces occupied by vitreous; in the left eye no trace of vitreous was found. Nodules of embryonic cartilage occurred in the retro-lenticular cellular tissue.

By far the most interesting point in the histology of these microphthalmic eyes was the presence in them of formations absolutely identical with the "rosettes" described by Wintersteiner as occurring in glioma of the retina. According to Wintersteiner the rosettes correspond to the neuro-epithelial layer (with this Lafon agrees), and result from a proliferation

of a group of undifferentiated cells of the external granular layer. These cells multiply, migrate into neighbouring parts, become organised into rosettes, and form the starting point of a neuro-epithelioma.

Lafon has distinctly followed all the stages of development of the rosettes, and finds their formation to be much simpler than Wintersteiner supposed. A small portion of the neuro-epithelium becomes invaginated, and is forced little by little into the subjacent layers, and finally becomes isolated. If Wintersteiner's rosettes are characteristic of glioma of the retina, Lafon's case ought to be classed as such, as the rosettes occurred abundantly over the whole extent of the retina. But there were no signs of a malignant growth. The cells were typical, and preserved their normal characters. There was no sign of rapid tissue growth, direct cell division or karyokinesis. Lafon could only conclude that Wintersteiner's conception of the significance of rosettes is an erroneous one, and that they are not pathognomonic of glioma retinae.

It only remains to account for the pathogenesis of the alterations described. The dimensions of the globe, as we have seen, correspond to a development of about $4\frac{1}{2}$ months, and it is assumed that an arrest of development occurred at that period. This had especially affected the mesoblastic tissues (sclero-corneal envelope and uveal tract), while the epiblastic tissues had continued their evolution. It has been shown that the rods and cones only begin to appear at the end of the fifth month, and their formation continues until the last. The retina had thus continued to develop in a cavity which was too small for it, with the result that it had become folded, its inner layers become disorganised and the neuro-epithelium, which was still growing, gave rise to the rosettes. Very suggestive in this direction is the work of Tribondeau and Récamier, who have found that X-rays applied to the newborn kitten's eye hinder its growth, but do not hinder the development of the neuro-epithelial layer of the retina, which, unable to find space to develop freely, becomes invaginated, forming an infinite number of fine tubes resembling the finger of a glove. These invaginate the subjacent layers, and may be found extending even as far as the nerve fibre layer. Wintersteiner's rosettes are an analogous formation.

To recapitulate briefly, the conclusions arrived at by Lafon are:—

(1) That the rosettes of Wintersteiner are not characteristic of glioma.

(2) That they are formed by an invagination of the neuro-epithelial portion of the retina into the subjacent layers.

(3) That their formation is due to an arrest of development (microphthalmos) or to the presence of an intra-ocular tumour (glioma), which, by impeding the evolution of the retina, causes an invagination of the neuro-epithelium with the formation of rosettes.

The article is valuable, and should be consulted in the original by those who are interested in ocular pathology.

J. BURDON-COOPER.

CLINICAL NOTES.

A GLAUCOMA "RECORD."

ANGUS MACNAB, F.R.C.S., London.

The permanency of the results of iridectomy in glaucoma is a question whose settlement must depend on statistical evidence. I have recently had the opportunity of examining a case which must approach "the record" in glaucoma, and take the opportunity of putting it on record. The following are the notes of the case:—

C.S., æt. 74. Seen at Moorfields in October, 1907, under the care of Mr. Lang. R. and L. wide iridectomy, tension R. full to plus 1, field contracted to a small excentric area on the temporal side. R.V. finger counting. R. lens hazy. L. tension normal. Field slightly contracted on the nasal side. L.V. less than 6_{66} , with -sph., combined with +6 cyl. ax. 180, L.V. 6_{36} . L. lens hazy, disc cupped.

The old records were as follows:—

February 13, 1869. C.S., æt. 34, admitted under Mr. Lawson. Glaucoma of R. three weeks' duration, media obscured, not much pain. T. + 3.

February 16, iridectomy R.

February 17, no pain, pupil clear, T.n. slightly increasing.

February 23, T.n. counts fingers.

February 24, slight improvement.

February 25, discharged.

January 3rd, 1874. C.S., admitted under Mr. Bowman. Glaucoma L. Idy. L.

January 10, disharged, good cleft, eye quiet.

Here is a case of glaucoma in which in one eye 39 years, and in the other 34 years after an iridectomy, the vision was apparently the same as it was immediately after the operation; and that, too, in spite of the tension being fairly high in one of the eyes.

THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED
KINGDOM.

Thursday, November 14th, 1907.

The President, Mr. MARCUS GUNN, in the chair.

CARD SPECIMENS.

Sarcoma of the Sclerotic.—Mr. W. T. Holmes-Spicer.

John S., aged 49, came to St. Bartholomew's Hospital complaining of a swelling on the right eye. In June 1904, he was working on a road, when a "spark" flew up and struck his right eye; there was slight bleeding at the time, and a little smarting, but nothing more was noticed until 6 months later, when his friends told him that there was a small black spot on the white part of the right eye at the outer side. This was at the place where the spark struck. He is sure that the swelling is getting larger.

Situated on the bulb of the right eye 7 mm. behind the outer margin of the cornea is a conical chocolate-brown protuberance, 5 mm. in height and 5 mm. diameter, which is hard and attached to the sclerotic beneath. There is superficial and deep hyperæmia, and running backwards from the swelling are two ridges which appear to be pleats in the conjunctival tissue in the neighbourhood. There are no enlarged lymphatic glands; the fundus is normal and the vision $\frac{6}{6}$.

Case of Obscure Uveitis of the Right Eye.—Mr. J. W. Bird.

This case was under the care of Mr. Treacher Collins at the Royal London Ophthalmic Hospital.

He had noticed floating specks in front of the right eye for 14 years. The only history obtainable was that 15 or 16 years ago, while chipping the side of a vessel, a piece of iron flew into the eye; this was removed by a doctor and no further notice was taken of it. He is married and has 3 children, and there is no history of miscarriages by his wife. R.V. $\frac{6}{24}$, L.V. $\frac{6}{9}$.

The right eye shows signs of inflammation of the whole of the uveal tract, there is K.P. but no definite iritis; in the vitreous are some fine opacities in front, with some coarser ones further back. The retina is very œdematous, obscuring the details of the fundus, but situated 2 disc-diameters to the inner side of the papilla is a more or less well-defined patch of œdema, with gross pigmentation as well as some atrophic

areas. Between this patch and the disc is a smaller spot of recent choroiditis and some cholesterin; and above this is a semicircular fold of œdematous retina, with its concavity downwards. There is a spot of congenital opacity in the lens.

The President considered this might be the result of a foreign body, though the history was rather indefinite; also a melanotic growth was a possible solution of the case; on the other hand the inflammatory signs suggested a spontaneous choroidal affection.

PAPERS.

The Anatomy of the Pectinate Ligament and its Bearing on the Physiology and Pathology of the Eye.—Mr. Thomson Henderson.

Mr. Henderson illustrated his paper with diagrams, models, and microscopical sections; and proceeded to show that the theory hitherto held of the pectinate ligament being formed by the splitting up of Descemet's membrane was erroneous. The appearance so described was due to the fact that the direction in which sections have been cut has generally been faulty; if accurately radial transverse sections are taken the following points can be made out. The pectinate ligament is a non-sclerosed part of the sclera, and is in direct continuity with the posterior layers of the cornea; as these fibres pass backwards they divide into two sets, a small outer one going into the sclera behind the canal of Schlemm, and an inner one which again subdivides into two portions, one going through the scleral ring and another internal to the scleral ring. The outermost part of this bundle gives attachment to the meridional fibres of the ciliary muscle, while the inner bundle passes backwards and inwards into the ciliary body and affords attachment to the intermediate fibres of the ciliary muscle, terminating in the connective tissue stroma of the circular muscle. The inner or ciliary set is simply part of the attachment of the whole of the ciliary muscle. The open network of the ligamentum is completed by the interlacing of the circular fibres of the sclera which surround the canal of Schlemm. None of the fibres of the pectinate ligament pass round into the root of the iris, and the criterion of an accurately radial section is that it shows a direct continuity between the hyaline layer of the ciliary body and the posterior limiting layer of the iris. This arrangement opens up a connection not only between the anterior chamber and Schlemm's canal, but also between the anterior chamber and the suprachoroidal space. Mr. Henderson suggested the name of "Cribriform ligament" as more appropriate than pectinate ligament, in view of this anatomical arrangement.

He further showed diagrams to illustrate the different histological structure at varying periods of life. In a child's eye the ligament merely

consists of young connective tissue cells not yet fibrosed; later on the inner part develops into fibrous tissue owing to the traction of the ciliary muscle; and at a later period still the outer part also becomes sclerosed.

Primary glaucoma is produced by the sclerosis of the fibres of the cribriform ligament, which narrows the meshes of the filtration network so as to impede the outflow of aqueous fluid.

This sclerosis of the pectinate ligament is a normal change which gradually proceeds as age advances, the occlusion in glaucoma is a pathological excess of the ordinary physiological process.

Glaucoma, of whatever nature, is the outcome of two factors, one constant, viz., the sclerosis of the filtration network, the other accessory and variable, viz., vasomotor changes.

In the discussion which followed, Mr. Harman considered that Mr. Henderson's theory made glaucoma appear a very definite and coherent disease, and he hoped it would prove to be all that the author desired.

Mr. A. Hugh Thompson wished to know why glaucoma was not more common than it is, seeing that the sclerosis of the pectinate ligament is a normal physiological process.

Mr. Treacher Collins asked whether the eyes of any animals had been examined, since he had showed (in the *Transactions of the IXth International Ophthalmic Congress*) that the pectinate ligament in animals was very different from that of the human subject. In the latter one did not see the pillar of the iris so very well marked, whereas in animals (especially the pig and ox) the pillar is a very striking structure, and it is these pillars which give rise to the comblike arrangement of the ligament. He also wished to know the history of the case of glaucoma, a section of which was shown in the diagram, as it was possible that the iris had fallen away from the posterior surface of the cornea as a result of the hardening process.

Mr. Lister thought it strange that one finds the iritic angle always closed in primary glaucoma if the essential feature is the sclerosis of the pectinate ligament.

Mr. Coats said there was nothing in this theory to account for the occurrence of glaucoma being more commonly met with in small eyes; and it took no account of the work on the growth of the lens in advancing age; and again, according to this view, whatever the original cause of the blocking, the resulting glaucomatous eye ought to show a shallow anterior chamber, whereas in increased tension following serous cyclitis, the anterior chamber is deep.

Mr. Parsons considered that Mr. Henderson's conclusions were the result of a new interpretation of well-known anatomical facts; and

that it must indeed be difficult to secure a section radial enough to meet all the requirements of the case. He would want stronger proof for the continuity of the endothelium into the suprachoroidal space; and there was very little doubt about the continuation of this layer on to the anterior surface of the iris. He explained that he did not deny the absorptive power of the iris, which Mr. Henderson seemed to infer, but that its importance had been exaggerated.

Mr. Henderson, in reply, said that as regards absorption, this occurred owing to the fact that the iris root never healed after an operation, and was not due to the tearing away of the root as described by Fuchs. He said, no animal's eyes had been examined except that of a cat when indian ink had been injected into the anterior chamber.

He explained the shallowness of the anterior chamber as secondary, owing to the inflow of fluid becoming greater than the outflow, and thus giving rise to swelling of the iris and its attachment to the posterior surface of the cornea.

Some cases of Interstitial Keratitis from Acquired Syphilis.—Mr. J. Herbert Fisher.

In this paper Mr. Fisher remarked on the extraordinarily few cases recorded before the Society compared with the number which must have occurred in the practice of almost every surgeon. He described four cases which had come under his own observation, and made use of them to elucidate the following points:—

1. At what stage in the disease the corneal condition manifests itself.
2. Whether it is more common for one or both eyes to become attacked.
3. What interval, if any, there is between the onset of inflammatory signs in the two eyes.
4. Whether the keratitis is more or less severe than that of the congenital form.

Three of the cases were men and one a woman, the latter had acquired syphilis 14 years before coming under observation, and in the case of the men the times respectively were five, three, and five years. There were other undoubted evidences of syphilis in all cases, though no sign in any of congenital characteristics. The actual affection of the cornea in all cases was of a typical interstitial nature, which was especially liable to take the form of an invasion from one particular part of the limbus, so that it was usual to find some part of the cornea clear and bright. There was never much vascularity, though in two cases a salmon patch was present for a time. In two of the cases some disseminated choroiditis was visible in the fundus, which in one case was more marked in the eye not affected by the corneal condition. The female

patient took 7 months to recover, but a few weeks of antisymphilitic treatment sufficed to effect a cure in the case of the male patients, and the corneal condition remained confined to one eye, probably as Mr. Fisher suggests, the result of early administration of iodide of mercury. In addition to these cases Mr. Fisher referred to one described by Mr. Lawford and himself in vol. xx of the *Transactions of the Ophthalmological Society*, and another which came under his own observation 8 or 10 years ago, where a medical man had developed a primary chancre on the lower lid in close proximity to the fornix, and in this case the secondary symptoms and the corneal condition had developed with unusual rapidity.

Mr. Fisher also described a case of interstitial keratitis affecting both mother and child, which came under his own observation at St. Thomas's Hospital in 1903. The boy, aged 12, showed a deep-seated haze of the upper part of the right cornea, with a salmon patch, while the left eye exhibited a faint nebula with characteristic arrangement of vessels; but there was no evidence of hereditary taint. The mother, who was left an orphan when quite young, showed nebulae in both corneae, with evidence of old iritis in the left, and was deaf. The father was said to be healthy. This case involves several interesting questions, viz., supposing the mother to be the subject of inherited syphilis, did she transmit the taint to the son without the intervention of the father? Or did the father reinfect the mother and so pass the condition on to the son? or did the father transmit the infection to the son without the reinfection of the mother?

In regard to the question how far succeeding generations may become influenced by the acquired syphilis of a parent, Treacher Collins has pointed out the higher mortality amongst the grandchildren of those who had acquired primary syphilis and suggested a dystrophic influence, and Dr. George Ogilvie has shown that skin affections are transmitted to the third generation but not to the fourth.

Mr. Sydney Stephenson pointed out that there were about 100 cases to be found in literature, and the average time of the development of the interstitial keratitis after the primary infection was 10·8 years. He considered that the unilateral nature of the affection was due to treatment.

Mr. Treacher Collins referred to two cases described by himself in *R.L.O.H. Reports*, vol. xvi, p. 16, where the primary infection was on the face but not in such close proximity as those of Mr. Fisher's; and yet in these cases the interstitial keratitis had followed very rapidly.

MALCOLM L. HEPBURN.

SOME NOTES AND OBSERVATIONS ON THREE HUNDRED AND TEN CONSECUTIVE OPERA- TIONS FOR EXTIRPATION OF THE LACHRY- MAL SAC.

By Major R. H. ELLIOT, M.D., B.S. (Lond.), D.Sc. (Edin.),
F.R.C.S. (Eng.), etc., *Indian Medical Service; Super-
intendent of the Government Ophthalmic Hospital,
Madras.*

IN the *Indian Medical Gazette* of August 1905, the writer published the results of 47 operations for the removal of the lachrymal sac, which he had performed in 12 months in the Government Ophthalmic Hospital, Madras. In the present paper he proposes to deal with 310 consecutive operations of the above nature, performed on 235 patients, and to discuss the results obtained.

These operations were performed in hospital and private practice in Madras between May 5th 1904, and October 8th 1907 ($3^5/_{12}$ years). A number of operations have been since performed and are still coming in, but cannot be included in the present paper. The relief afforded may in some measure be gauged by the increasing popularity of the operation, as judged of by the following figures:—

From May 5th 1904, to May 5th 1905... .. 47 cases.

From May 6th 1905, to May 5th 1906... .. 98 cases.

From May 6th 1906, to May 5th 1907... .. 125 cases.

The practice of Medical Officers in the Southern Presidency affords additional and not less valuable evidence. Whereas previous to the publication of the above paper in

1905, there was, so far as one can trace, no record of the performance of this operation in South India, there are now, to my knowledge, five Medical Officers who, having seen me perform the operation, have themselves adopted it. Three at least of them have written to me, or told me, that they are fully satisfied it is all that has been claimed for it.

Indications for extirpation of the sac, in the presence of lachrymal obstruction or dacryo-cystitis;—

- (1) Dilatation of the sac.
- (2) Purulence of the sac-contents.
- (3) Evidence of previous attacks of phlegmonous dacryo-cystitis, with persistence of the stricture.
- (4) A history of long-standing obstruction, combined with inability or unwillingness on the part of the patient to submit to a long course of probe-treatment; or with a timidity which renders it unlikely that such treatment will be persevered in.
- (5) The presence of any indication for an operation on the globe of the eye (especially cataract).
- (6) The presence of a septic ulcer in the eye of the same side.
- (7) Any factor, occupational or otherwise, which increases the liability of the patient to eye-injury. Not a few of our cases of septic ulcer of the cornea in Madras occur amongst fitters, goldsmiths and stone-masons; in all of the above, and in many allied trades, tiny chips of hard substances frequently fly up and injure the cornea.
- (8) The existence of double lachrymal obstruction, with evidence of past or present mischief in one cornea, is a strong indication for the removal of both sacs.

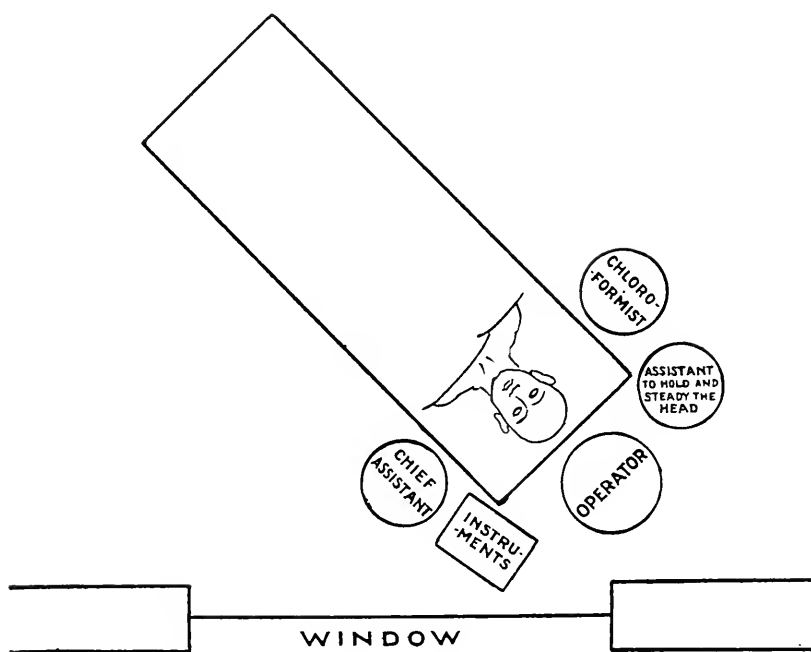
It would be almost easier to point out the indications for the old and conservative methods of dealing with

lachrymal obstruction and dacryo-cystitis. They may be stated as follows:—

(i) The absence of inflammatory or marked structural changes in the passages; and

(ii) On the part of the subject, (1) the courage and patience to persevere through a long, tedious and painful course of treatment, and (2) the means and the leisure to give the necessary time required by the surgeon.

In other words, given an early simple case, in a man of means and leisure, we may adopt conservative treatment, always with the proviso, that failing success, we fall back on extirpation of the sac.



Rough Diagram to show position of Table, Operator, Assistants, etc., for extirpation of Left Lachrymal Sac.

Steps of the operation.

Preliminaries. The operation is performed under chloroform, the patient being prepared in the usual way. The sac is squeezed dry of its contents, which are caught and removed on antiseptic swabs, the face is again washed. The surgeon sits facing the patient's head, as shown in the diagram. The patient's head is towards the light, and his feet away from it; but he is placed obliquely (according to the side) so that the light falls on and illuminates the side of the face on which the operation is being performed. The positions of the tray for instruments, of the assistant, etc., are shown in the diagram.

(1) Skin Incision. Define the internal palpebral ligament by pulling the lids outwards; and make the lower border of this the upper limit of the incision; it is practically never necessary to divide this ligament, and it is most advisable not to do so, as when it is divided there is a risk of deformity after healing. Next, define with the finger the anterior lip of the lachrymal groove, and cut boldly down on this, following its course with a crescentic incision, first downwards and then outwards. The average length of incision in the 310 cases was 20 mm. Easy cases only require an incision 15 to 18 mm. long, whilst matted tissues demand much more room (the maximum in any case being 27 mm.).

(2) After separating the lips of the wound by the aid of a Müller's retractor, define the layer of fascia which closes in the lachrymal groove, and divide this throughout the length of the skin incision. This may usually be done with the end of a small sharp elevator. With the same instrument, the sac is separated from the adjacent bone, internally and posteriorly. If not adherent, the sac may

also be cleaned with the elevator on its outer side as well, up to the point of entrance of the canaliculi.

(3) The dome of the sac is seized with a fine pair of forceps (conjunctival forceps do well) and drawn firmly downwards, whilst a pair of blunt-pointed scissors, curved on the flat, is used to free the dome from its upper attachments (working under the palpebral ligament for this purpose), to cut through the canaliculi, and to follow the sac down into the nasal duct; this duct is divided as low as possible, the sac being pulled firmly up for the purpose.

(4) As large a probe as possible (Nos. 9 to 12 Theobald) is then thrust down the nasal duct till stopped by the palate, pushing any mucous membrane in front of it, and a red-hot spindle-shaped cautery is thrust boldly down the duct, to ensure the destruction of this membrane.

(5) The cavity is dried and examined. The removed sac is carefully examined under water and slit open to make sure that no part has been left behind. If any portions have been so left they are dissected out; and if necessary the neighbourhood of the dome of the wound is cauterised freely with a ball-shaped red-hot cautery.

(6) The cavity is freely flushed with a $1/3000$ solution of biniodide of mercury, and the wound closed with three skin sutures. An aseptic pad and bandage closes the eye of the operated side, the other being left free.

The case is dressed on the seventh day, when the stitches are removed and the eye is released.

Hæmorrhage is dealt with by means of pressure and the use of adrenalin chloride solution. Any troublesome bleeding point is touched with the red-hot cautery. For pressure I have always used sterilised swabs of cotton-wool, mounted on sticks 4 inches long, and about $3/16$ inch in diameter.

When the case is complicated by the presence of septic ulcer of the cornea, the latter is dealt with at the same sitting. Of many methods tried none give such good results as the use of the red-hot cautery, combined with paracentesis of the chamber. Such eyes are opened daily, and protargol solution (1 to 8) is instilled; atropine or eserine is used as indicated.

Complications met with before operation.

(1) Acute abscess of lachrymal sac, with phlegmonous inflammation of surrounding face.

(2) Lachrymal fistula.

(3) Ulcer of the cornea, especially of the septic type.

(4) Cataract or other deep-seated disease of the eye.

With the exception of the first, all these have been dealt with elsewhere in this paper. It is the custom here to incise a lachrymal abscess freely, at the same time curetting its cavity, and sponging it out with a solution of perchloride of mercury (1 per cent.). When the inflammation has subsided the sac can be removed; it is necessary to wait about a month as a rule. In one case the sac was extirpated within a few days of incision. The circumstances of the patient left no apparent alternative, as otherwise she would have gone away and probably soon had a return of the severe inflammation when she was away from medical aid. As a rule such haste is inadvisable.

Difficulties and complications met with during operation.

(i) The terminal branch of the facial artery should be avoided in the first incision, or it causes troublesome hæmorrhage (*vide* my paper, *Indian Medical Gazette*, August 1905).

(ii) When the lachrymal sac is not dilated or distended,

it is not uncommonly bound down into the lachrymal groove by a dense fascia, which appears to be a backward reflection from the tendo palpebrarum. This fascia is often very dense; farther, when the bridge of the nose is high, and the orbits are consequently deep-set, the plane of this strong band of fascia comes to lie nearly parallel to the median sagittal plane. On the contrary, a low nose-bridge and a flattened type of face throw this fascial plane farther forwards on its outer side, *i.e.*, more into the plane of the face; the obvious result of this latter conformation is to render the wound shallower, and the sac more accessible. The former condition has naturally the opposite effect; both the depth of the wound and the plane of the sac tend to embarrass the operator, who may easily burrow outward into the orbit, and mistake a lobule of fat for the sac. Such an accident need never happen if, after a first clean skin incision the wound is held well open (by a speculum or otherwise), all hæmorrhage is stopped, the nasal margin of the lachrymal groove is well defined with the finger, and the dense fascia cleanly divided as close to this bony edge as possible. The sac is at once seen lying within its sheath of bone and fascia, and the operation can be proceeded with on the usual lines.

(iii) Hæmorrhage may be troublesome at three stages: (1) after the skin incision, (2) after division of the deep fascia over the sac, or during separation of the sac, and (3) from the nasal duct after the passage of the probe down its length. Firm pressure deals most easily with the first and second, aided if need be by a touch with a pointed cautery over any bleeding spot; the last is best stopped by plugging the wound with a cotton-wool swab, to clean and dry it, and then rapidly passing a spindle-shaped cautery down the passage, before it has time to bleed again.

(iv) When there has been preceding phlegmonous inflammation, and still more when there has been a long-standing fistula, the superficial structures are so matted as to be unrecognizable separately. It may even be difficult to recognise the sac itself. If one cuts boldly down on the anterior crest (naso-maxillary) of the lachrymal groove and separates the sac from the bed of the groove with the elevator, it is not difficult to seize the thickened sac wall in the grip of a fixation forceps and then to cut the sac boldly out with the surrounding structures, keeping as close to the former as possible.

(v) When one desires to perform a cataract extraction, or other serious operation on the globe of the eye, and the lachrymal passages are found (as tested by dropping fluoresceine into the conjunctival sac and examining a handkerchief into which the patient has strongly blown his nose) to be closed, even though there may be no very obvious retention, the writer thinks that it is safer to remove the sac before undertaking the more serious intra-ocular operation. In this class of case it is common to meet with a shrivelled, contracted sac, which is tightly adherent to the surrounding parts. If so, the lachrymal groove is opened as usual, the elevator used to free the sac on the inner and posterior aspects, and the head of the sac is then seized with forceps and drawn downwards, whilst the sac is separated snip by snip from the surrounding parts, some of which are necessarily taken with it. The same method is applicable to the cases where, though the sac can be easily defined anteriorly, internally and posteriorly, it is yet adherent externally to the tissues in its neighbourhood, as the result of long-standing past inflammation. It is a question of operating by feel rather than, or at least more than, by sight; and it is better to

proceed boldly, and if any portion of the mucous membrane is left behind, to remove it after stopping all hæmorrhage, when the wound can be freely and well examined. The writer makes it a rule to consider that, if the cavity does not look clean, or in other words if he is in doubt as to the thoroughness of his operation, the whole of the sac has not been removed. Nothing less than a thorough inspection of the wound should then suffice. A paraffin syringe was obtained for the hospital in the earlier days of this operation, with a view to defining the limits of the sac in difficult cases. Before it had time to arrive, further experience had shown that it was always possible, granted a little perseverance, to thoroughly extirpate any sac. The troubles of paraffin injection have thus been avoided, though it is conceivable that the use of this method would appeal to some who have not the opportunity of doing many operations of the kind, and who might on this account be only right to use all possible aids. One cannot but think, however, that the difficulties of the operation have been overestimated, for out of 325 extirpations performed in this hospital during the last $3\frac{1}{2}$ years, there has been only one in which it was necessary to operate a second time on account of a portion of the sac wall having been left behind: moreover, the case in question was only the fourth of the series, and the writer before commencing extirpation himself, had only seen one previous operation of the kind (by Professor Völckers of Kiel).

(vi) When there is extensive and deep ulceration of the cornea complicating the case, it is necessary to be most careful to avoid pressure on the globe during operation: as otherwise the eye may be ruptured with escape of its contents.

Complications met with after operation.

(1) Recurrence of retention, due to a portion of the sac wall having been left behind at the operation. This occurred only once and in the fourth case of the series. It has already been dealt with.

(2) Failure to obtain primary union of the wound, or breaking down of the wound after primary union appeared to have been established.

(3) Progress of the septic ulceration of the cornea for which the operation was undertaken.

(4) A chronic catarrhal condition of the lower lid, which is difficult to treat, but which yields eventually to patient treatment along the ordinary lines; it is better not to be too active.

Note.—The second and third headings have been dealt with at length elsewhere in the paper.

Statistics of 310 operations for removal of the lachrymal sac, performed on 235 patients in Madras, from May 5th, 1904, to October 8th, 1907.

(1) *Age incidence.*

Aged	1 to 20.	20	patients	or	8·51 %
„	21 to 30.	30	„	or	12·77 %
„	31 to 40.	32	„	or	13·62 %
„	41 to 50.	84	„	or	35·74 %
„	50 and above.	69	„	or	29·36 %

(2) *Sex incidence*: 118 were males, 117 females.

(3) *Side affected*: right 159, left 151.

(4) *Period elapsing* between patient first noticing disease and coming to hospital.

Under 1 year	...	...	...	156	cases or 50·32 %
1 to 2 years	...	...	...	63	„ or 20·32 %
2 to 3 years	...	...	...	35	„ or 11·29 %
3 to 4 years	...	...	...	8	„ or 2·58 %
4 to 5 years	...	...	...	17	„ or 5·49 %
Over 5 years	...	...	...	31	„ or 10·00 %

The histories are very unreliable, and probably *greatly* understate the duration of the disease in a large number of the cases.

(5) *Course of the disease.*

Chronic cases in which there had at no time been abscess formation	...	...	...	...	258 or 83·22%
Chronic cases in which there had at some time been abscess formation	...	...	...	...	39 or 12·58%
Acute cases presenting themselves with phlegmonous inflammation	...	...	...	...	13 or 4·19%
Number of cases complicated with fistula	...	...	...	...	32 or 10·32%

(6) Number of cases in which at the time of discharge, the patient appeared to have been cured or relieved by the operation	...	...	...	...	308 or 99·36%
Number of cases in which the operation failed to relieve the condition for which it was performed...	...	...	...	...	2 or 0·64%
Number of cases in which, though the patient left hospital relieved, it was known that the case subsequently ended in disaster...	...	...	...	...	1 or 0·32%

The following gives a summary of the notes of the three cases above alluded to:—

No. 83. Male Hindu, æt. 30; duration of disease 4 years; for one month complicated by ulcer of cornea; sac thickened, dilated and distended with mucus; it was removed entire; section at once healed, and corneal ulcer also healed steadily for a month; then without any obvious cause ulceration recommenced and panophthalmitis supervened rapidly; evisceration performed a week later.

No. 216. Hindu male, æt. 50; duration 4 years; 14 days ago was struck on eye by branch of tree, and septic ulcer of cornea rapidly supervened; he had lost opposite eye in the same way 1 year ago; there was a large central aperture in the cornea, through which the lens presented; sac thick-walled, dilated, distended with pus, and very adherent; operation difficult and prolonged; in spite of care the lens unfortunately escaped during the operation; the skin wound healed, but the eye passed on to pan-ophthalmitis; it was recognized that the case was a desperate one before operation.

No. 259. Hindu male, æt. 60, a mason; duration 1 year; recently (indefinite period) injured eye with stone chip, and septic ulcer supervened; sac slightly dilated and distended with pus; contents expressed and protargol dropped in for 9 days; all parts matted; hæmorrhage very troublesome; a difficult operation; wound healed at once, and so did ulcer; was under observation for 3½ months, doing excellently in every way, and greatly relieved; he returned 1 month later with pan-ophthalmitis, cause unknown; evisceration was at once performed.

Note.—Cases 83 and 259 illustrate the dangers of septic ulcer, even after apparent healing. In both cases the removal of the focus of infection resulted in healing of the ulcer, but did not eventually save the eye; it is not unlikely that some small accident determined the loss in both cases, by lighting up the dormant activity of the septic organisms in the strata of the cornea, which organisms were responsible for the ulceration in the first place.

(7) Indications for extirpation of the lachrymal sac recognized in the 310 operations under review. It is to be taken for granted that lachrymal obstruction or dacryocystitis, or both, were found in every one of the 310 eyes.

(1) Presence of septic ulcer of cornea ... 45 or 14·52%

(2) Presence of the combination of corneal
septic ulcer and lachrymal mischief
in the opposite eye ... 12 or 3·87%

- (3) Evidence that in the past there had
 been a combination of severe corneal
 inflammation, and lachrymal mischief
 in the opposite eye 2 or 0·64%
 (4) Special liability to injury 22 or 7·09%

Note. This figure is probably far too low, as it includes only the dangerous trades, such as fitting, goldsmith-work, carpentering, and stone-hewing; it takes no account of the risks run by cultivators. The latter risks, though very real, are very hard to estimate in individual cases, and the figure given is therefore admittedly unreliable.)

- (5) Dilatation of sac 172 or 55·48%
 (6) Purulence of sac-contents 151
 Muco-purulence of sac contents... 41 192 or 61·93%
 (7) History of previous attacks of phleg-
 monous dacryo-cystitis 52 or 16·77%
 (8) Presence of a fistula 32 or 10·32%
 (9) Presence of cataract 83 or 26·78%
 (10) Residence outside Madras (taken on
 the 235 patients)... .. 152 or 64·68%

Note 1. A very large percentage of these patients would not have submitted to any form of treatment demanding a long stay in the Presidency town. It is not possible to reduce this factor to percentages or figures. The same may be said of another very powerful and common factor, viz., the timidity of these patients, who would not, in a very large number of instances, endure a prolonged and painful course of probe-treatment.

Note 2. It is obvious that several of the above indications co-existed in many cases. It has not seemed worth while to carry the analysis further.

(8) *Duration of operation.*

Longest time taken over one operation (one

of the earliest cases) 50 minutes

Shortest time taken over one operation... .. 4·5 minutes

Average time per operation, taken on the 310 operations	... .. 12 minutes
Average time per operation, taken on the last 150 operations	... .. 9.5 minutes

(9) *Names of officers by whom the operations were performed:—*

By Major R. H. Elliot	... .. 284 operations
By Major T. H. Foulkes	... .. 9 operations
By Captain H. Kirkpatrick	... .. 13 operations
By Lieutenant Heffernan	... .. 4 operations

In the following tables, only the last 150 operations are considered, as owing to a more elaborate and systematic system of note-taking, the notes in these cases are full in every detail, whereas in the earlier 160 there are omissions here and there, which would render a constant change of totals necessary, and so complicate the calculations.

(1) The fascia which closes in the lachrymal groove, was a dense, definite membrane, and could be recognized as such in 118 operations or 78.6%.

The above fascia was so thin as to be unrecognizable or nearly so in 16 operations or 10.6%.

The parts were so matted that no definite structures could be separately recognized in 16 operations or 10.6%.

(2) The sac bulged into the wound and could be at once recognized on the completion of the skin incision in 53 cases or 35.3%.

The sac did not so present in 97 cases or 64.6%.

Note. The contents of the sac were always carefully expressed before operation, to avoid leakage of the contents into the wound. Had this not been done, the sacs would have been distended and a larger proportion would have presented in the wound; this would have made the operation easier, but less safe.

(3) The sac was thick-walled in 116 instances or 77·3%. It was average or thin-walled in 34 instances or 22·6%.

The sac was adherent to the surrounding parts in 137 instances or 91·3%; free from adhesions in 13 instances or 8·6%.

The sac was dilated in 75 instances or 50%; not markedly dilated in 37 instances or 24·6%; distinctly contracted in 38 instances or 25·3%.

(4) The number of sacs removed entire was 107 or 71·3%; removed in pieces was 43 or 28·6%.

(5) The number of cases in which the nasal duct was patent was 108 or 72%; occluded was 42 or 28%. The number of cases in which the lower end of the sac was patent was 99 or 66%; did not appear to be patent was 51 or 34%.

(6) The number of cases in which the nasal duct was alone cauterized was 76 or 50·6%; the nasal duct and the dome of the wound were both cauterized was 73 or 48·6%; the dome of the wound was alone cauterized was 1 or 0·6%.

(7) The number of cases in which the adjacent bone was healthy was 80 or 53·3%; carious was 70 or 46·6%.

(8) Number of wounds which healed by first intention, 146 or 97·33%; in which primary union failed, or in which the wound subsequently broke down, 4 or 2·66%.

Some notes of these 4 cases are of interest. The numbers prefixed to each are the serial numbers of the cases.

No. 228. Hindu female, æt. 5 years; trouble began soon after birth; sac greatly dilated and distended with pus (maximum diameter of sac 20 mm.); it had burrowed out a large cavity in surrounding bone at the expense of nasal duct, which was very short in consequence; some thin pus expressed on 7th day; wound soundly healed on 9th day, and remained so; heard of 3½ months after operation, well and immensely improved by operation.

No. 279. Hindu female, æt. 10; alleged duration of obstruction 1 month; lachrymal abscess formed 10 days before admission; it was

at once incised; sac was removed 5 days later, as the patient would not stop long in hospital; section healed at once, and she was discharged healed on 19th day; she returned 23 days later with a fistula in usual position, which was freely curetted, bringing away a quantity of rough bone; wound plugged with lint; discharged soundly healed 13 days after second operation.

No. 281. Hindu female, æt. 14; duration given 9 months; abscess of sac 3 months ago, succeeded by fistula which was seen on admission; operation difficult due to dense matting of parts, close adhesions to surrounding tissues, and free hæmorrhage; discharge purulent before operation; deep retention of pus; incision down to bone thrice made, and wound scraped each time; the third time a quantity of carious bone was removed; patient discharged soundly healed 51 days after operation.

No. 298. Hindu male, æt. 60; duration 1 year; contents of sac mucoid; operation rapid (8 minutes' duration), and uneventful; some secretion retained in wound on 7th and 9th days, soundly healed on 12th day.

As bearing on the delayed healing in these four cases the following points are to be noted:—

(1) 75% of these cases occurred in children; whereas of the total number of cases under review, only 8·51% were below 20 years of age. Possibly the children were more prone to interfere with their dressings.

(2) In 2 cases the sac was dilated (50%).

(3) The sac contents were purulent in 3 cases (75%).

(4) There had been previous lachrymal abscess in 2 cases, and there was a fistula at the time of operation in both (50%).

(5) In 2 cases the wound failed to heal till past the 50th day, and in both of these, healing took place as soon as some spicules of bone had been expelled (50%).

(6) The other 2 cases healed on the 9th and 12th days respectively. The latter is the only case in which no definite factor obstructing healing can be traced, but the patient's age (60) may be borne in mind.

(9) Latterly a strong effort has been made to follow up the after-course of these cases; it is therefore possible to give more accurate figures for the last 150 than for the earlier ones. They are as follows:—

Number of instances in which patients have
 been heard of doing well, and pleased
 with the results of operation, after an
 average period of 3 months 53 or 35·33%

Patient did well for 4 months, and then got panophthalmitis	1 or 0·66%
Number of instances in which patients had been heard of after an average period of $2\frac{1}{2}$ months, stating that the operation had not relieved the watering and other symptoms (none came back to hospital, though all were asked by letter to do so)	9 or 6·00%
Number of instances in which operation failed, due to unarrested progress of the septic ulcer which co-existed	1 or 0·66%
Number of instances in which the result of the operation has not been traced, in spite of every effort; all the patients were doing well when last seen on discharge from the hospital	86 or 57·33%

N.B.—It should not be forgotten that, even when some watering and lachrymation continue, in spite of the removal of the original source of irritation (the inflamed sac), the patient has been rid of 2 serious dangers, viz.: (1) the infection of any trifling injury of the cornea with septic matter from the inflamed sac, and (2) the onset of attacks of phlegmonous inflammation of the face.

In this connection, the following facts are of interest.

Total number of septic ulcers of cornea admitted to the Government Ophthalmic Hospital, Madras, from January 1st to September 30th, 1907, was 118.

Of these,

The number complicated with acute inflammation of the conjunctiva was	55 or 46·6%
The number complicated with lachrymal mischief was	17 or 14·4%
The number in which a definite cause for the septic condition of the ulcer could not be assigned was	46 or 38·9%

The bacteriological aspect of this question cannot be dealt with in the present paper; but will be taken up later.

It is not possible in the present paper to enter into the very interesting questions of the pathology and ætiology of lachrymal obstruction and of dacryo-cystitis in India. The large number of cases which present themselves at this hospital suggest that there must be a very prevalent first cause at work. It is easy to trace the histories from lachrymal obstruction, through retention of secretion and dacryo-cystitis, to phlegmon on the one hand and to septic ulcer of the cornea on the other; but the initial stage is much harder to correctly understand. The writer is not at present in a position to discuss this very important matter, but certain facts have come to light, which are not without interest, and which it is hoped may be dealt with at length later. A large number of sacs have been sent home to Mr. George Coats, the Pathologist of the Royal London Ophthalmic Hospital, who has most kindly examined them, and who will, it is hoped, later on be able to go into the subject thoroughly. From his examinations two facts have stood out so far: (1) that tubercle is not responsible for these cases, for in no single case has he found evidence thereof, and (2) that in a number of the specimens the sac-lining showed well-formed follicles. When one takes into account the great prevalence of trachoma in this part of India, and the frequency with which one meets with follicular enlargements connected with inflammation of the post-nasal mucous membrane in patients here, it seems not at all unlikely that this may be the key to the prevalence of lachrymal trouble in the South of India at least. However, the matter is still *sub judice*. In this connection it is of interest that Basso, who likewise works in a country where trachoma is rife,

has found abundant evidence of trachoma of the lachrymal passages in the sacs he has excised for "rebellious" cases of obstruction (*The Part Played by Trachoma in the Pathology of the Lachrymal Passages*, by D. Basso: *Annali di Ottalmologia*, xxxv, 1906, fasc. 7—9). Hertel had noticed the existence of lymph-follicles in the removed sacs of certain cases of lachrymal obstruction as far back as 1899 (*vide Graefe's Archiv*, Bd. 48, 1899). On the other hand Tooke, of Montreal, was unable to find evidence of follicular formation in his Canadian cases (*vide B.M.J.*, December 22nd, 1906, page 1814).

One is still frequently asked by visiting surgeons, what becomes of the excessive lachrymal secretion, after removal of the sac. No opportunity has presented itself of actually examining a lachrymal gland subsequent to an operation. But it is to be remembered that in most of these cases there is no clear passage even before the sac and duct are removed. It is also to be borne in mind that the nervous supply of the gland, of the passages, and of the intermediate irrigated region (the cornea and conjunctiva) is from one and the same source: it is therefore only natural to suppose that if we remove a source of constant irritation in the shape of the inflamed passages, we rid the whole lachrymal system of the previously existing irritation and excitation. Whether this explanation be right or wrong, one thing at least is certain, viz., that the extirpation of the sac is practically invariably followed by an immediate diminution of lachrymal secretion: in a large number of cases, as has been seen, this happy result appears to be permanent.

PROFESSOR SNELLEN.

HERMAN SNELLEN died on January 18th, at the age of 73. In early life the assistant and later the colleague and co-worker of Donders in his physiological researches, for many years Professor of Ophthalmology in the University of Utrecht, and Director of the Eye Hospital of that city, old enough to have witnessed the rapid development of our art in the days of Helmholtz, von Graefe and Bowman, yet young enough to have been actively at work within the last few years, Snellen has long been an outstanding personality and an honoured leader among us. He was famous far beyond the limit of his own country. Ophthalmic surgeons from all parts of the world visited Utrecht in order to see him and his work, and to very many of them he extended the delightful hospitality of his home. In his private consulting-room he often, in the course of a single day, spoke with his patients in four different languages—Dutch, French, German and English. Energetic and fond of travel, he took an important part during many years in the gatherings of his professional brethren in other countries, and was always, whether in general meeting or in social intercourse, a welcome and distinguished visitor—dignified, courteous, genial towards all, and full of humour. Of the Ninth International Ophthalmic Congress at Utrecht, in 1899, he was President.

Of Professor Snellen's work we can speak here only in the briefest manner. He gave us the classical "Test-types for the Determination of the Acuteness of Vision" which are in use all over the world, and the ingenious test for feigned blindness by means of red and green letters viewed through red and green glasses. He devised operations for trichiasis, entropion and ectropion. To him we owe a signal improvement in the form of the artificial eye, and



PROFESSOR SNELLEN.

From a photograph taken in 1892.

the aluminium shield which for many of us has banished the bandage and diminished the risk in the after treatment of cataract. He was an admirable operator, confident, ingenious, and resourceful. The writer heard the following anecdote from his own lips:—A personage of importance came to him in trouble, needing an operation for glaucoma, but unable to undergo it because he could not take chloroform and could not stand the operation without. Both courses had been attempted and abandoned as impossible. Snellen, doubting the reality of the difficulty, undertook the case. Trying first without chloroform, he found the patient so devoid of self-control that he could not proceed; trying then with chloroform he had to desist by reason of alarming symptoms. The patient was in despair; not so Snellen. "We will try again, to-morrow," he said. "Give me leave to treat you as may seem best at the moment and we shall still succeed." The patient willingly consented. Again, at the critical moment, he became unruly, but this time instantly received a sharp reprimand and a sounding slap on the face, which so far startled or terrified him into stillness that Snellen was able to make the iridectomy without mishap—and to earn thereby the gratitude of the patient.

For cataract extraction Snellen preferred (we speak of what we saw fifteen years ago) the "simple" operation, and used no speculum. He attributed loss of vitreous to the latter, and employed in its stead the skilful fingers of his eldest son, the present Professor of Ophthalmology in Utrecht. He adopted the use of a lighted candle as a fixation object for the patient during operation, as explained in his Bowman Lecture. He set store on covering an operation wound by a conjunctival flap wherever possible, and addressed the Edinburgh Congress of 1894 on this subject.

The fine modern Eye Hospital of Utrecht was designed and built under his supervision. He promoted improvements in School Hygiene, especially in the construction and graduation of desks and seats. He wrote, with

Landolt, the chapter on "Tests of the Functions of the Eye," in the first edition of the *Graefe-Saemisch Handbook*. In 1896 he delivered the Bowman Lecture, a record of important original research on "Vision and Retinal Perception," and was elected an Honorary Member of the Ophthalmological Society of the United Kingdom. The Honorary Fellowship of the Royal College of Surgeons of Ireland was conferred upon him in 1892.

The photograph which we reproduce was taken in Dublin on that occasion.

It is not too much to say that Snellen had a special liking for our country. The lady whom he married, and who survives him, is of English descent. His twelve children nearly all bear English names. While vigour lasted he came to England almost every year. It is certain that nowhere outside his own country will he be remembered with more honour and affection than among his brethren here. In London, in Edinburgh, in Dublin, and in many other parts of the United Kingdom he leaves old friends who will be saddened by the thought that they will see him no more.

REVIEWS.

K. WICK. **The Simulation of Blindness or Defective Vision and its Detection.** Second edition, by A. Roth. Pp. 101. Berlin: S. Karger, 1907.

WICK's monograph is the most complete work which has yet appeared on the above subject. Roth, who prepared the second edition owing to the unfortunate death of the original author, has added to the value of the book by including the literature which has appeared since 1900, and by contributing some introductory remarks.

In ordinary practice a very elementary knowledge of the various methods of detecting feigned blindness suffices, as a rule, to expose the delinquent. But amongst soldiers, especially on the Continent, where conscription is in force, simulated defects of vision are very common, and not only this, but surgeons have frequently to deal with men who are adepts in the matter, and some of whom have acquired a certain degree

of knowledge of the methods employed for their detection. It is particularly in such cases that really expert knowledge is required on the part of the surgeon who must have a great variety of tests at his command and must be familiar with them in all their details. These are amply provided in the work before us, which was indeed written by military surgeons.

The authors have considered it convenient for practical purposes to divide cases of simulation into three groups, viz., (1) simulated defect of vision in one or both eyes, but the patient reads the larger letters of the usual test types; (2) simulated blindness or great defect of vision in one eye only; (3) simulated blindness or considerable defect of vision in both eyes. Among the methods dealt with are: testing with ordinary test-types at different distances, at different times, with rapidly changeable letters, or again, in order to mislead the patient in his judgment of distance, the letters are seen through a tube or reflected in a mirror; the use of spherical or cylindrical combinations other than those employed to correct refraction; coloured letters and glasses; various methods of using prisms; stereoscopes with or without reflectors; instruments in which the visual axes are crossed, or in which a small portion of the field of vision in each eye is excluded; examination of the field of vision and of the light sense. Finally, we may mention, the objective examination of the eye, pupillary reaction, binocular fixation, and the general behaviour of the patient.

The book is full of small details, which, although apparently unimportant, may make all the difference between success and failure in carrying out a test. When using prisms, for example, instead of asking the patient what he sees, or if he sees two lights, it is better to assume that two lights are seen, and to ask the person under observation what are the respective positions of the two lights. Again, a case is detailed in which a man was convicted of simulation in the following way:—He was shown two candles in a darkened room; the surgeon then stood in front of the man ostensibly to put on the spectacle frame containing the prisms, but he at the same time obscured the patient's view of the lights, and in the meantime an assistant rapidly removed one of the lights, so that when the surgeon stepped aside the man had no hesitation in saying that he saw two lights with the prism.

As a matter of literary curiosity it may be mentioned that Fallot in 1836 pointed out that in cases of simulated total blindness of both eyes, if the finger or a sharp instrument be

suddenly pointed at the patient's eyes, even if he does not blink or shrink back, the action of the heart will be increased and can be felt by the hand of the surgeon. Fallot states that he owed this idea to Sir Walter Scott, who was once at a horse-fair, where an animal supposed to be perfect in all respects was on the point of being bought, when a blind man appeared and said that the horse was blind, which proved to be the fact. When asked how he knew this, he said that he felt the horse's heart with one hand while he waved the other rapidly before its eyes, and no change in the heart movements took place.

In this review we have merely given a general idea of this very useful book, as it would be impossible to deal, in the limited space at our disposal, with the multitude of facts which it contains.

L. W.

L. MEILLE (Turin). **The Ophthalmo-Reaction in the Diagnosis of Tuberculosis.** *Rassegna di Terapia*, 1907, xiv.

IN this recently suggested test for the presence of tuberculosis we have a method which cannot be neglected, though its value may yet turn out to be more limited than its ardent supporters would have us believe. The ophthalmo-reaction was introduced by Prof. Calmette, and consists in the determination of the presence or absence of a tubercular lesion in the body by the reaction of the eye to tuberculin. If a small quantity of tuberculin be introduced into a scarification on the skin of a tuberculous subject, a reaction occurs which is—at the very least—exceptional in healthy individuals. After 48 hours redness and oedema come on, and a papule develops resembling the initial lesion in vaccinia, which remains about a week. Considering this fact, Calmette bethought him of trying the reaction of the conjunctiva, this being a membrane which very readily takes up toxins, and which can very readily be manipulated and examined. He made a series of experiments on the subject, his method being to use a single drop of a 1 per cent. solution of precipitated dried tuberculin. If the result is positive the palpebral conjunctiva becomes injected in from 3 to 5 hours, fibrinous exudation then taking place. After this the eye gradually quiets down, the whole cycle taking from 18 to 24 hours.

Among those who have worked at this test and its bearings, Meille reports the result of his investigations. With the exception of two individuals, he obtained a positive reaction in all of eighteen patients on whom he tried it, all being sufferers

from tubercular mischief in one part of the body or another. These two exceptional cases were also unquestionably tubercular, for in the sputum there was abundant presence of the special bacillus, but the patients had been for a long time under treatment by injection of tuberculine, and had acquired great tolerance for it, so that the dose barely sufficient to produce reaction was very large: that probably was the reason for the absence of the ophthalmic-reaction.

The author comes to the conclusion that in this test we have a means of determining the presence or absence of tubercle in an active state in any patient, a means which he describes as simple, harmless, and elegant. The method has these great conveniences, that it can be employed without admitting the patient to hospital, may be used without danger even to patients whose temperature is raised, and cannot in any way enhance the severity of such lesion as may exist in lung or elsewhere.

There is no recorded case, as yet at all events, in which the use of tuberculin has produced any long-continued or deeper-seated inflammation of the eye than this slight, transitory, painless conjunctivitis. It is not necessary to employ a large "dose," the smaller ones give the reaction, the larger merely irritate longer and are not more definite.

We believe that dry tuberculin, listed as "Calmette's test," and intended for the investigation of the ophthalmic-reaction, can now be obtained commercially in France.

There is an interesting paper also on the subject of the ophthalmic-reaction, by Aubaret and Lafon in *La Clinique Ophthalmologique* of September 25, 1907.

W. G. S.

HERTEL (Jena). The Employment of Light Treatment Locally in Diseases of the Eye, especially in Ulcus Serpens: An Experimental and Clinical Study. *v. Graefe's Archiv für Ophthalmologie*, lxxvi., 2.

THE publications of Finsen on the light treatment of lupus vulgaris raised hopes, already partly realised, regarding the wider application of this treatment. Lundsgaard has successfully treated lupus of the conjunctiva by light rays in Finsen's Institute. Others have suggested, or actually employed, some form of light treatment in various corneal affections. The paper under review is of special interest, as Professor Hertel

treats the subject from a scientific as well as a clinical standpoint. In the first part of the paper he recapitulates some of the more important results of a highly elaborate series of experiments. In all these experiments the wave length and intensity of the radiations were exactly known. The source of light used was generally the induction spark between different metal electrodes. The object exposed to the radiations was so arranged as to be visible under the microscope. In this way the effect of the radiations on the cells could be minutely followed. In every case the radiations acted as a stimulus or irritant to the cell protoplasm.

The effects were naturally most readily observed in the case of cells possessing locomotory or contractile power. An important practical finding was that bacteria of all kinds were much more sensitive to the radiations than the tissue cells, and especially the fixed tissue cells of higher vertebrates. While, for instance, an exposure of only a few seconds was found to kill bacteria, a very much longer exposure was necessary to produce changes in the tissue cells, *e.g.*, in the cornea of the rabbit.

Hertel also found that tissues able to take up the energy of radiations of longer wave length, as, for instance, pigmented tissues, reacted actively to these radiations. The sources of light used for therapeutic purposes in ophthalmic work should, however, be rich in radiations of short wave length. The retina is more susceptible than any other tissue to rays of long wave length. To expose the eye to rays of this sort would therefore be to run a risk of injuring the sensitive retina. Hertel ascribes the action of the rays, short and long alike, to their influence in separating oxygen from the more easily deoxidised portions of the cell plasma and causing it to form new combinations. Cell proliferation may be an indirect result of exposure to the rays, but in experimenting with the eggs of sea-urchins Hertel always found that rays of light produced a diminution of the mitotic figures. The cell proliferation which has actually been observed must therefore be put down as an indirect result of the radiations due to the hyperemia which they cause. Hertel ascribes the existence of a latent period after exposure to the rays simply to the fact that we are not able to follow the finer changes in the cells. At the same time, in practice we must bear its existence in mind lest we should too hurriedly, in the absence of any gross definite change, conclude that the rays had produced no effect.

With regard to the penetrating powers of the radiations, some interesting facts are brought to light; for instance, the ultra-violet rays from the magnesium spark were able to penetrate the cornea to a slight extent, but were completely absorbed by the lens. The retina, screened by the vitreous, lens and cornea, is without doubt quite protected from the rays employed.

In the clinical part of his investigations Hertel employed as a source of light the spark between two hollow electrodes made of an alloy of cadmium and zinc. The hollow electrodes were kept cool by a stream of water passing through them. The lamp was enclosed in an aluminium casket and fitted with a quartz lens to focus the rays. He used a current of $3\frac{1}{2}$ ampères with a voltage of 220. This lamp, the construction of which is carefully figured and explained in the text, was found very satisfactory in actual use.

In testing the value of the light treatment Professor Hertel confined himself to cases of hypopyon keratitis (*ulcus serpens corneæ*). This condition appears to us a very suitable one for testing the effects of the rays, as the pathology and clinical course are so well known. The indications for treatment with the rays were made the same as for treatment with the cautery, that is to say, the treatment was adopted only in cases of progressive ulceration. Atropine was used as an adjunct in treatment.

Forty-seven cases are briefly described, and the results of treatment noted.

In the first group of cases, 26 in number, the treatment was successful without recourse to the cautery. The eyes were exposed to the rays generally from 3—5 minutes. In many of the cases several sittings were required, at intervals of from 12 to 24 hours.

In the second group of cases, the light treatment having failed to check the spread of the ulcer, recourse was had to Saemisch's section of the ulcer.

In the third group, in which light treatment also failed, the cautery was used, combined in some cases with Saemisch's section.

Commenting on the cases, Hertel points out that the first effect of the light treatment was to cause an increased injection of the eye, often with chemosis, an appearance of increased infiltration of the ulcer, and an increase of the hypopyon. This reaction makes it more difficult for the surgeon to judge

of the state of the ulcer, whereas if the cautery be employed any fresh spread subsequent to its use is very readily detected.

The most important advantage of the light treatment lies in the very slight scarring which follows its use in successful cases. The vision in 21 cases out of a series of 44 amounted to more than $\frac{6}{60}$. As many of these ulcers were large and central, this result is striking. Unfortunately the treatment does not seem effective in a considerable proportion of cases, but this proportion, Hertel thinks, might be lessened by improved technique. One has also to bear in mind that in most clinics there occur a small number of cases of *ulcus serpens* in which the spread of the ulcer is not checked by the cautery nor by Saemisch's section.

We have no doubt that Hertel's paper will stimulate work on similar lines. Certainly the results of treatment in *ulcus serpens* leave much to be desired, especially when we think not merely of healing but of preservation of function.

J. V. PATERSON.

W. CZERMAK. **The Operations of Ophthalmic Surgery.**

Berlin and Vienna: Urban and Schwarzenberg, 1907.

ALREADY there appears a second and enlarged issue of the late Prof. Czermak's elaborate and comprehensive work on operations, although it is but a very short time since our review of the first edition appeared in these pages. Only the first volume has as yet been issued by the publishers. It is under the care of Prof. Elschmig, of Prague, that this edition is being brought out, but really Czermak's work was so well kept up to date that in the section which has appeared the new editor has had little to add to it. The matters chiefly dealt with in this first volume are instruments, of which a careful description is given, with many diagrams, sterilising apparatus, the preparation of the patient with a view to operation (in which section much careful and painstaking advice is given and a good deal of counsel of perfection), and, after a brief run over the anatomy of the parts involved, operations on the lids. We await with much interest the appearance of the succeeding volumes.

BABINSKI and J. CHAILLOUS. **Therapeutic Results of Lumbar Puncture in Optic Neuritis of Intra-Cranial Origin.** *Annales d'Oculistique*, July, 1907.

THE therapeutic rôle of lumbar puncture in ocular pathology has hitherto attracted little attention, but this neglect has

been remedied by MM. Babinski and J. Chaillous's instructive and valuable report on eight cases of optic neuritis of intra-cranial origin treated by lumbar puncture.

In the first case there was compression with intra-cranial effusion due to a fall on the head. In five cases symptoms of meningitis were present. Syphilis appeared to be the cause in one patient. In three of these patients the ocular symptoms consisted in papillitis and paralysis of the 6th cranial nerve; a fourth showed no lesion of the cranial nerves beyond the optic neuritis; in one case the etiology was doubtful, but was probably due to meningitis.

Lumbar puncture in all these cases was followed by happy results, viz., rapid amelioration of the subjective symptoms in certain cases and at times considerable diminution of the objective ones. In nearly all cases the first evacuation of cerebro-spinal fluid was followed, after an interval of from eight to ten days, by a very notable diminution or disappearance of the œdema of the papilla. The blurring which persisted, the light veil which covered the borders of the disc, usually took a longer time to disappear.

In another case, that of a child with hydrocephalus, lumbar puncture was the means of diminishing the symptoms of intra-cranial compression. In a patient suffering from cerebral tumour the results were only palliative.

In order to avoid the accidents which are sometimes observed after lumbar puncture the authors call attention to the observation of the following points, viz.: First, the patient should be placed in the horizontal position; second, the cerebro-spinal fluid should be evacuated very slowly, drop by drop, and in small quantity (8—10 c.c. at most); third, the patient should lay up for several days.

The conclusions that the authors arrive at are that lumbar puncture ought to be considered as a curative method of treatment of optic neuritis due to intra-cranial effusion either of post-traumatic or of inflammatory origin. In cases due to intra-cranial tumour the puncture is only palliative. In all cases the lumbar puncture ought to be practised with prudence, and the quantity of the fluid evacuated ought to be less elevated where the symptoms of compression are less marked. The puncture ought to be repeated whenever it is deemed necessary to avoid the disorders due to the compression, and in particular the optic atrophy which may follow optic neuritis of intra-cranial origin.

E. M. LITHGOW.

HISTORICAL NOTE ON GLAUCOMA.

Terson has published (*Archives d'Ophthalmologie*, October, 1907) an interesting account of some researches he has made concerning the earliest mention of the hardness of the eyeball in glaucoma. His researches lead him to believe that the first definite statement of the hardness of the globe to finger pressure was made by J. Platner in his book published at Leipsic in 1745. In this work, which is entitled "*Institutiones Chirurgiæ rationalis, tum medicæ, tum manualis*," in ascribing certain cases of glaucoma to an affection of the crystalline lens, Platner stated as follows:—"Proximum his vitium in lente crystallina est, si ea cum suo velamento multum et ita intumescit, ut reliquæ partes ab ea *premantur*. Hoc his indicis cognoscitur *oculus durus, digito renitens*, attolitur et magis quam naturaliter consuevit, *prominet*. . . . Aliud vero glaucomatis genus est, *si vitreus humor intumescit*, corrumpitur et obscurus est. Is tamen longe frequentius dissolvitur, et oculus qui caligat, concavus sit atque *flaccidus, qui prementi nihil renititur*." And again . . . "Ubi vero oculus qui caligat, intumescit *durusque fit*." These sentences seem to indicate clearly that the writer recognised both increase and diminution of intra-ocular tension by digital examination. Platner, who lived from 1694 to 1747, occupied the chair of Anatomy and Surgery at Leipsic, and published several papers on ophthalmic subjects.

J. B. L.

THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Thursday, December 12th, 1907.

The President, Mr. MARCUS GUNN, in the chair.

An Unusual Form of Cataract.—Mr. E. J. Smyth.

THOS. G., aged 60, attended Moorfields under Mr. Morton on Nov. 12th, 1907, with the history of failing sight in the left eye for 6 weeks. There had been no injury of any importance, and no foreign body was found by X-ray photography.

R.V., with correction, $\frac{6}{6}$ partly; L.V., $\frac{4}{60}$.

Occupying the layers of the cortex between the nucleus and the anterior pole is an oval star-shaped opacity, its long axis horizontal, the rays of which are broad at their base, tapering to a point at their free end. The other parts of the lens are clear, there are a few vitreous opacities, and the fundus is normal.

Curious Corneal Opacity.—Dr. P. C. Bardsley.

George A., aged 53, had suffered from diminution of sight in the right eye for 3 months. The family history is negative; there is evidence of early disseminated sclerosis.

On the right cornea, situated down and in, near the periphery, is a superficial opacity, surmounted by a fringed cap consisting of several linear markings placed close together with comparatively clear spaces between. The whole area represents what has been called a "mush-room-shaped" opacity of the cornea, and is beginning to show some signs of degeneration.

Varicose Veins of the Conjunctiva.—Mr. G. Coats.

A pathological section exhibited was of a case under the care of Mr. Lang, at the Royal London Ophthalmic Hospital, on April 27th, 1905. It showed 4 large dilated veins, with some smaller channels of the same type, lying close under the conjunctival epithelium, and separated from each other by a fine layer of fibrous tissue. The epithelium varied in thickness, being thinner over that part where the vessels come nearest to the surface. There were no proper vessel walls, but the spaces were lined by flattened endothelium.

Multiple Congenital Malformations.—Mr. J. Herbert Parsons.

A boy, aged 10 months, was brought to the Gt. Ormond Street Hospital on Dec. 3rd, 1907, and was found to be the subject of an extreme convergent strabismus, probably due to absence, ill-development, or mal-insertion of the muscles. In addition, the right eye was microphthalmic, and the pupil was displaced inwards. The left eye was well formed, and the pupil, larger than the right, acted well to light and dilated moderately under atropine.

The fundus, examined under chloroform, showed in the right eye a good red reflex and the disc apparently normal. Down and in was a greyish mass streaked with bright reflex from the surface, and scattered about were a few yellowish patches with some pigmentation, one of which was found in the macula.

In the left eye there was a coloboma of the disc and another of the choroid in the usual situation, the latter being sharply defined with some heaping up of pigment at the margin; and in other places were areas which appeared dark and coarsely stippled, and in this situation were seen several white spots and streaks of two definite types: one round, sharply-defined, containing no pigmentation, the other slightly yellowish, angular spots with a certain amount of pigment at the edge.

The greyish mass in the right eye is probably atypical development of vitreous. The angular patches in the left fundus resemble those seen in microphthalmos with orbital tumour (Parsons, *Trans. Ophthalm. Soc.*, vol. xxv, 1905), which have been shown to be due to absence of retinal pigment (Parsons and Coats in "Brain," vol. xxix, 1906).

Investigation into the family history, birth of the child, etc., revealed nothing of importance.

PAPER.

Some cases possibly allied to Tay's Infantile Retinitis (Amaurotic Family Idiocy).—Mr. E. Nettleship.

In this paper Mr. Nettleship sought to establish some points of resemblance between a certain class of cases showing amblyopia with definite macula defects in adults, and those cases of central retinitis of idiotic infants first described by Waren Tay in *Trans. Ophthalm. Soc.*, vol. i, p. 55, and vol. ix, p. 158. He alluded to cases brought forward by Batten (*Trans. Ophthalm. Soc.*, vol. xxiii, p. 386), Mayou (*Ibid.*, vol. xxiv, p. 142), and S. Stephenson (*Ibid.*, p. 144) as being possibly of such a nature that, if examined earlier in life, changes similar to those found in Tay's retinitis might have been present.

Mr. Nettleship mentioned twelve cases which had come under his own observation, and which had not been definitely proved to be related to Tay's retinitis, but in which some fine changes at the yellow spot were associated with day- and colour-blindness, dating from some severe derangement of nutrition.

The points common to most of the cases were :—

1. Their occurrence in patients of Jewish parentage.
2. The absence of syphilitic taint.
3. The presence of day-blindness, or dislike to bright sunlight.
4. The presence of colour-blindness.
5. Some form of visual defect often amounting to distinct amblyopia.
6. Fulness of fields for white.
7. Changes at the yellow spot.
8. Atrophic appearance of the optic disc.
9. Defective mental ability either in the patient, or in one or more members of the family.

In two of the cases no record of colour vision was taken, in three the recognition of colours appeared to be normal, in three no changes at the yellow spot were present, in three others the optic disc showed no signs of atrophy, while in another three the mental condition was not defective.

The changes at the macula varied from a general haze to well-marked areas of pigmentary degeneration with some definite white spots.

Mr. Nettleship considered that if patients with Tay's retinitis survived the infantile stage, some such appearance as was presented in these cases might possibly be found. He laid stress on the question of diet as a predisposing cause in the development of this type, and suggested that a toxic cause, either *in utero* or soon after birth, might excite the initial stages.

MALCOLM L. HEPBURN.

SIMPLE NOTES ON OBLIQUE PRISMS.

By J. BURDON-COOPER, M.D., B.Sc., F.R.C.S. (Edin.), Bath.

- (1) Horizontal and vertical components of an oblique prism.
- (2) To determine the numerical value in degrees of any prism placed obliquely in the trial frame.
- (3) The simultaneous correction of horizontal and vertical deviations by a single prism.

The following simple notes on some fundamental principles of oblique prisms are published, hoping that they may prove as helpful to others as they have been to the writer.

The writer feels an apology is needed for the mathematical character of the notes, which is unavoidable, as it is almost impossible to treat the subject in a lucid manner by any other means. The mathematics, however, need not trouble any one, as the calculations are of the simplest.

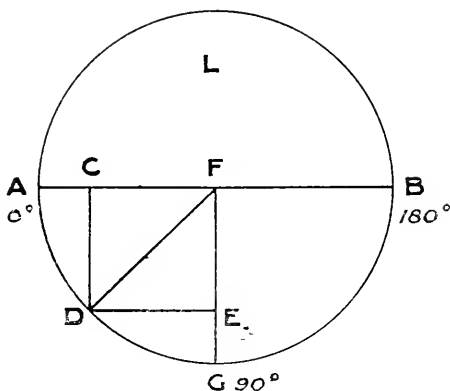


Fig. 1.

(1) In fig. 1, AGB is a circle of which F is centre. AF, FG and FB are radii. For simplicity we may regard it as the left cell of a trial frame. The point A being 0° , G= 90° and B= 180° . Now suppose we place a prism of say 4° in the frame with its base-apex line in the direction FA= 0° , apex at A. In this position it is exerting its full effect laterally. A streak of light viewed through the prism will be displaced in the direction of its apex to the maximum extent. As the prism revolves around F as centre, AF may be taken as a measure of its horizontal component. In this position, with its base-apex line 0° , its horizontal component is the maximum, viz., 4° , and it has no vertical component. All its power is expended in producing a purely horizontal deviation. In the same way FG represents its vertical component at 90° . In this position the prism has no horizontal component, all its power is expended in producing purely vertical deviation. In the positions 0° and 90° (and of course 180° and 360°) a prism cannot be resolved: it possesses only one component. In any intermediate or oblique position two components may be found for any given prism—one horizontal and one vertical.

(2) Suppose we turn the 4° prism in the frame so that its base-apex line= 45° , as represented by FD in fig. 1. It is required to find its vertical and horizontal components.

From D draw CD at right angles to AF and DE at right angles to FG. A little consideration will show that CD or FE measures the vertical component and DE or CF the horizontal. In other words the vertical component is proportional to the sine, and the horizontal component

proportional to the cosine of the angle through which the prism is turned.

In the example we have chosen

CD measures the vertical component of a 4° prism at 45° , but

$$CD = DF \sin AFD = 4^\circ \times \sin 45^\circ = 4^\circ \times \frac{1}{\sqrt{2}} = 3^\circ.$$

That is to say a 4° prism placed at 45° is equivalent to a 3° prism placed vertically.

In the same way CF or DE measures the horizontal component of a 4° prism at 45° .

But $CF = DF \cos CFD$

Substituting $\sin (90^\circ - CFD)$ for $\cos CFD$

$$= DF \times \sin (90^\circ - 45^\circ) = 4^\circ \times \sin 45^\circ = 4^\circ \times \frac{1}{\sqrt{2}} = 3^\circ.$$

That is a 4° prism placed at 45° is equivalent to a 3° prism at 90° in vertical deviating power.

At 45° , and of course at 135° , then, the two components of a prism are equal, and a prism in either of these positions will correct simultaneously vertical and horizontal deviations of equal magnitude. This will be alluded to later.

From the above it follows, if we know the sines and cosines of angles from 0° to 90° , we have all the data required to calculate the value of any prism at any angle in the trial frame. To simplify matters, I have drawn up the following table (of sines and cosines) giving the vertical and horizontal components of a 1° prism at intervals of 5° from 0° to 90° .

TABLE SHOWING VERTICAL AND HORIZONTAL COMPONENTS
OF A 1° PRISM AT VARIOUS ANGLES FROM 0° TO 90° .

Angle in Degrees.	Vertical Component.	Horizontal Component.		Angle in Degrees.	Vertical Component.	Horizontal Component.
5°	0.08	0.99	—	50°	0.76	0.64
10°	0.17	0.98	—	55°	0.86	0.57
15°	0.26	0.96	—	60°	0.86	0.50
20°	0.34	0.94	—	65°	0.90	0.42
25°	0.42	0.90	—	70°	0.94	0.34
30°	0.50	0.86	—	75°	0.96	0.26
35°	0.57	0.81	—	80°	0.98	0.17
40°	0.64	0.76	—	85°	0.99	0.08
45°	0.70	0.70	—	90°	1.00	0.00

By the aid of the table it is the easiest possible thing to find the components of any prism at the angles given. All that is necessary is to multiply the factor corresponding to the angle by the value of the given prism. An example will make this plain.

Supposing it is required to know the prism which, placed horizontally, is equivalent to a 5° prism at 60° . Look up in the table the horizontal component for 60° . This we find is 0.5. Multiply this by the value of the given prism $= 5 \times 0.5 = 2\frac{1}{2}$. That is a $2\frac{1}{2}^\circ$ prism horizontal is equivalent to a 5° prism at 60° . The vertical equivalent of the same prism at $60^\circ = 0.86$ (see table) $\times 5 = 4^\circ 18'$.

(3) It now remains to show how a single prism placed obliquely may be made use of in correcting simultaneously co-existing horizontal and vertical deviations.

Suppose, for example, we have a vertical deviation which we want to correct with a 1° prism, and co-existing with this there is a lateral deviation for which we desire to use a 2° prism, what we require to know now is the value of the new prism and the axis at which it must be placed in order that the above conditions may be realised.

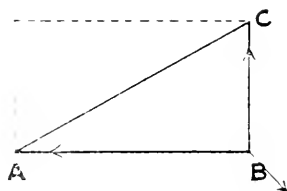


Fig. 2.

In the triangle ABC (fig. 2), BC and BA may be considered as representing two forces with a value of 1 and 2 respectively. In the figure we make $AB=2\ BC$, and complete the parallelogram. The diagonal AC represents the value of the resultant force, and BAC measures the angle of the direction of this resultant with the horizontal, and ACB the same with regard to the vertical. If in the example we have chosen we can find the value of the angle CAB in degrees, and the value of AC in terms of the same unit with which AB and BC are measured, we shall have solved the problem.

In the fig. $\tan CAB = \frac{CB}{BA} = \frac{1}{2}$.

From a table of tangents we find the angle whose $\tan = \frac{1}{2} = 27^\circ$ about; that is, in order that the two rectangular components of the resultant which we have still to find may be to one another as 1:2, the resultant prism must be set at 27° with the horizontal.

We have still to find AC.

$$BC^2 + AB^2 = AC^2.$$

Substituting the values of BC and BA we have $1^2 + 2^2 = AC^2$, that is

$$AC = \sqrt{1 + 4} = \sqrt{5} = 2.25 = 2^\circ 15'$$

That is, a prism of $2^\circ 15'$ at an angle of 27° has as its vertical and horizontal components prisms of 1° and 2° respectively. This can be proved most simply by the table

we have already given. The vertical component of 1° prism at $25^\circ = 0.42$

$$27^\circ = 0.45 \text{ about.}$$

$$0.45 \times 2^\circ 15' = 1^\circ.$$

Similarly the horizontal component $= 2^\circ 15' \times .891 = 2^\circ 1'$ which is near enough for all practical purposes.

To recapitulate,

(1) The vertical rectangular component (or equivalent) of an oblique prism is that prism which, placed at 90° , is equivalent in vertical deviating power to the given oblique prism, and is equal to the sine of the angle which the latter makes with the horizontal multiplied by its value in degrees.

(2) The horizontal equivalent of an oblique prism is that prism which, placed at 180° , is equivalent in horizontal deviating power to the given oblique prism, and is equal to $\sin (90 - \text{angle which the latter makes with the horizontal})$ multiplied by its value in degrees.

(3) The resultant of any two prisms which are rectangular components is equal to the square root of the algebraic sum of the squares of the prisms.

(4) The ratio of the vertical to the horizontal prism measures the tangent of the angle which the resultant prism makes with the horizontal.

It might be said, in conclusion, that the above method of arriving at the result is far from being as laborious in practice as might appear at first sight, for by the aid of a table of natural sines and tangents, and one of four place logarithms, which are to hand in most consulting rooms, any case can be worked out in a surprisingly short time, and with the minimum mental effort. A table of square roots is unnecessary.

REVIEWS.

HESS. **On the Extent of the Retinal Area Sensitive to Pupillomotor Impulses, and on the Organs which receive these Impulses.** *Archiv für Augenheilkunde*, Sept., 1907, lviii., 2 and 3.

Does the pupil react to light impulses received on any part of the retina or only to impulses received at the macula or its immediate neighbourhood? The generally-accepted opinion, based on the rough clinical method of testing the pupillary reaction, is in favour of the first of these two alternatives. By employing tests more carefully thought out and applied, Professor Hess comes to the conclusion that it is the second one that is true.

Two facts render the ordinary clinical method of testing the pupil reaction valueless for the purpose of deciding the question at issue. One is that on whatever point in the retina light is focussed the amount of light which is diffused, and so reaches other parts of the retina, is always considerable. The other is that with lateral illumination the amount of light which passes through the iris, and even through the sclera, is perceptible, and may be sufficient to cause a contraction of the pupil. But though one cannot altogether do away with the diffused light which strikes the macular region one can make it a constant quantity, and the method of Hess consists in focussing the light which enters the pupil successively on different points in the circumference of a circle which has the macula as its centre and the distance between the fovea centralis and the centre of the blind spot as its radius. When the light is directed towards the blind spot it is only the diffused light that can possibly have any effect, either in exciting a sensation of light or in causing a pupillary reflex. When it is directed towards any other point of the retina away from the blind spot, but at an equal distance from the centre of the macula, the amount of diffused light will be equal to what it was in the first case, but in addition to that the direct rays will also have an effect on the rods and cones at the retinal point on which they are focussed.

For the purpose of these experiments an instrument is employed similar to McHardy's perimeter. At the fixation point a small lamp is fixed whose light can be so reduced that

it is only just clearly perceptible to the observer. On the perimeter there is a movable lamp whose brilliancy can also be regulated, and which is placed behind a diaphragm with an opening of variable size. The observer sits before the apparatus wearing black motor-goggles entirely opaque except for a minute central opening in front of the left eye, through which to see the fixation lamp, and a circular slit in front of the right eye of such a diameter as to admit rays from the movable lamp when this is 20 degrees from the fixation point. The size of both pupils will vary according to the amount and direction of the light thrown into the right eye, and the observer will be able to perceive the variations in his left pupil by the variations in the size of the spot of light seen with the left eye. In order to do away with any chance of diascleral illumination, the movable lamp must never be moved further from the fixation point than 20 degrees.

The result, so far as the pupil is concerned, of directing the light towards the blind spot is exactly the same as that of directing it towards any other point in the same circumference, *i.e.*, the experiments go to disprove the theory that the parts of the retina above, below and outside the blind spot have any pupillo-motor fibres at all; no pupillary action can be called forth by this method, in fact, outside a circle of 3 mm. radius from the macula.

A second series of experiments was based on the fact that the pupil of an eye adapted for dark acts more readily to light than that of an eye adapted for light. An illuminated square surface was held before the eye to be tested, which fixed a point on the lower border of the square for a minute or two, so that while the lower half of the retina was adapted for light, its upper half was adapted for dark. The same apparatus as before being used, the movable lamp was now used to illuminate two points in succession equidistant from the macula, first in the light-adapted part of the retina and then in the dark-adapted part. Outside a radius of 2 mm. from the macula no difference in the pupil reaction could be discovered, an experiment which goes to prove that the part of the retina possessing pupillary fibres must be at greatest 4 mm. in diameter.

These experiments throw doubt on the validity of the clinical observations hitherto recorded on the subject of the hemianopic pupillary reaction. On the other hand, the clinical deter-

mination of even one well-marked case of hemianopic reaction (such as has been observed by the reviewer, and probably by many of his readers) is sufficient to throw doubt on the adequacy of these experiments. The matter must be regarded as an open question.

The remainder of this interesting paper consists of a speculation as to the exact position in the retina of the apparatus through which the pupillary reaction is called forth. In most birds the spectrum is considerably shortened at the blue end compared with that which is visible to us, owing to the presence of red and yellow oil globules between the inner and outer limbs of the cones. In the retinae of night birds, such as owls, these oil globules do not exist. Now if the apparatus for receiving pupillomotor impulses is in the inner granular layer, as some have maintained, there would be no difference in the action of different colours in exciting the pupillary reaction. But Hess's experiments showed that with day birds (pigeons, hens, jackdaws) the greatest reaction is obtained with orange and yellow light, blue being almost powerless to excite any reaction. With owls, on the other hand, the reaction is greatest with green light; towards the long-waved end of the spectrum it falls very rapidly, towards the short-waved (blue) end much more gradually, corresponding to the normal condition of the human eye when adapted for dark. These facts tend to show that the reason for the different behaviour of the pupil in day birds lies in the existence of the before-mentioned yellow and red oil globules, and the conclusion is that the pupillomotor apparatus is located in the outer limbs of the cones.

A. H. T.

LAGLEYZE (Buenos-Ayres). **The Eye in Albinos.** *Archives d'Ophthalmologie*, May, June and July, 1907.

ALBINISM may be defined as a teratological anomaly characterised by the total or partial absence of pigment.

Professor Lagleyze has treated the questions connected with its occurrence with the greatest thoroughness, but a perusal of his writings will reveal but few facts or theories which present new ideas to the scientific ophthalmologist.

He commences his article with a careful resumé of "general considerations" of the normal colouration of the eyes; and points out various interesting but well-known facts, such as: The iris in the newly-born child is of a more or less intense

blue colour; during the first year this colour is undergoing a gradual modification, but at the end of the second year assumes its permanent tint. In females, in spite of their lighter skins, this tint is deeper than in males.

Heredity plays an important part, as one would expect; 80 per cent. of children inherit the parental colouration, provided that both parents have eyes of the same colour. Where the parents have different coloured eyes the children usually inherit the deeper tint. The same applies to the pigmentation of the hair, and consequently the number of blonde individuals is diminishing.

The nature, development, distribution and physiology of the uveo-retinal pigment are treated at some length by the author. At the fifth month of foetal life the stroma of the iris is without pigment, but its retinal layers are well pigmented; at birth, too, according to Kölliker, the choroid is devoid of pigment.

The first published descriptions of the condition date from the commencement of the eighteenth century. Wafer, in 1704, relates how he found the first albinos in Panama. Blumenbach, in 1784, called attention to the presence of albinism in Chamounix, and was the first to point out that the reddish colour of the pupil was due to this cause. Early travellers in Africa reported cases in Guinea, Algiers, Madagascar and the Congo. Wissman found many albinos on the West African Coast, a few in Central Africa and none on the East Coast. Dubois stated that the condition was by no means rare amongst Indians. De Paul, in 1774, believed that albinism did not exist in Europe, but was only found in the zone comprised between 10° north and south of the Equator. Other writers thought that the greatest number of cases were found in negroes, that albinism was characteristic of a certain race, that female albinos were prolific while male albinos were sterile.

Different black tribes regard albinos in very different lights; some look upon them as objects of veneration, while others either persecute or kill them. In Guinea they are held to be tutelary spirits, and are reported sacred and invulnerable. In Senegambia, on the other hand, they are persecuted as sorcerers. In Uganda they were considered as curiosities, and were placed in the entourage of kings. In Parrot Island, at the mouth of Calabar River, an albino infant was sacrificed to the God of the Whites, when no European merchantship had

called there for a considerable period. In some parts of Africa an albino is supposed to be the offspring of a woman impregnated by a gorilla: while other quaint superstitions ascribe its paternity to an aerolith, to the star of the morning or to the devil.

That albinism was not prevalent is shown by the fact that when the Dutch took possession of Java the Sultan at that time had only three albinos in his court, and it took four years to collect four others. To-day it is known that the geographical distribution of albinism is not limited, and that climate has no influence in its production: also that albinism is not of recent origin, but has probably existed from early ages.

In the Argentine the author collected 27 cases out of 30,000 patients. In the ophthalmic clinic of the hospital to which he is attached, in twenty-six years, during which he saw more than 100,000 patients, no case of albinism presented itself.

Albinism is classified by the majority of authors according to the method of Geoffroy Saint-Hilaire:—

1. *Complete*, in which there is a total absence of pigment in the body.

2. *Incomplete*, where the pigment is below the normal amount.

3. *Partial*, when in certain parts of the body of an otherwise normal subject the pigment is either absent or diminished.

Birds, it may be of interest to note, are more liable to the condition than mammalia, and reptiles less so. The author divides the abnormality into:—

1. *General albinism*: α complete, β incomplete.

2. *Partial albinism*: α complete, β incomplete.

Complete Albinism of the Eye.

Among the symptoms enumerated by Professor Lagleyze may be noted:—

The *attitude*, due to photophobia. The head is bent forward, the lids half closed, and the hand is frequently held to shield the eyes in a bright light.

General condition normal: the limited intelligence noted by some observers is not sufficiently common to be considered symptomatic.

The *colour of the iris*, varying according to the amount of light, the red predominating when the illumination is brilliant, violet grey in a dim light.

The *pupil* is small, and dilates very little in a diminished light. The reflexes are present, but feeble; and the pupil is frequently ectopic. The iris was thought by some observers to contain many apertures, but this was a mistake arising from faulty methods of examination.

The *optic disc* is either of a reddish colour, which may even be deeper than that of the fundus, or grey.

Nystagmus, rarely absent in complete albinism, is generally of the horizontal type, with large oscillations of a rapidity equalling on the average 60 to 100 per minute. The movements may also be rotatory or mixed. It appears generally in early infancy, occasionally it is congenital. "The presence of nystagmus must be attributed to amblyopia. I do not believe that it has a central origin."*

Visual acuteness is always diminished owing to a true *amblyopia*. Colour vision and the field of vision are normal, according to Forster.

Refraction. The most common error is myopia in the opinion of most observers. The author has found no preponderance of myopia over hypermetropia in his cases, but astigmatism of about 4 D is usually present.

Complications. These are such as one would expect to find in a condition due to some developmental defect. Strabismus was present in one-third of the author's cases.

Pathological anatomy. Blumenbach at the end of the eighteenth century was the first to describe the absence of pigment in animals. Wharton Jones found the pigment absent in the hexagonal cells of the retina. Bruecke found that the pigment was wanting in the whole uveal tract and the stroma of the choroid. Broca described the thinning of the iris between the two "circles." Nettleship, in 1905, showed sections of the retina containing pigment only at the macular region.

Prognosis. Many authors have affirmed that albinism is capable of being modified. Streatfield, for example, quotes the case of a woman aged 36, who stated that until she was 14 years

* It has been suggested that the nystagmus may be partly at least compensatory or protective; without it the feeble pigment at the macula might be very readily "burnt up" by the excessive illumination.

she was an albino, but after that age commenced to become pigmented. Such changes are only possible in "incomplete albinism."

Etiology. Heredity and consanguinity are important factors in the production of albinos.

Borda-Smit says that "on account of the anarchy which followed the emancipation of the Argentine, the population of Cordoba lived in almost complete isolation from 1813 to 1870, and this circumstance gave rise, in both the higher and lower classes, to the custom of consanguineous marriages, to such an extent that nearly all the Cordovans are to-day related to one another," and to this cause the author attributes the presence of albinos in that district. It also seems true that a parent with partial albinism may have children who are complete albinos. In 27 cases of the author's, five had no hereditary influence, of the remainder 13 were children of consanguineous parents.

The transmission of albinism is very inconsistent: it may miss one or several generations. In certain families all the children are albinos, in others there may be one or more alternating with normal children. Consanguinity appears to the author to be answerable for the majority of cases.

Blumenbach, Darwin and others found that in animals albinos were generally deaf. Rawitz discovered that in albino dogs the organ of Corti was absent and the auditory centres were atrophied. Blumenbach and others ascribed the condition to a pathological cause, and in support of this idea instanced the physical and mental inferiority which they found in some cases. Robin believed that some arrest of development of the central nervous system was the cause, and with this view the author seems disposed to agree.

Treatment. To proscribe marriages between individuals who are affected with the condition, as well as marriages of consanguinity, would be the only sound method of prophylaxis. The correction of refractive errors and the use of tinted glasses are practically the only means of helping the patient. Haab suggested the tattooing of the cornea, leaving the pupillary area clear. This, of course, would not affect the light which percolates through the sclera.*

* For an interesting suggestion as to treatment see review of a paper by Komoto, *Ophthalmic Review*, 1907, p. 304.

Partial Albinism of the Eye.

Cases have been quoted of complete partial albinism in which a portion of the iris, choroid or retina was totally devoid of pigment by Franke, Dor and Muller. Nettleship cited several cases of absence of pigment in the fundus, while the iris, eyebrows and lashes were normal. Sichel also described cases where one-half the fundus or patches of the fundus were devoid of pigment.

The author regards as examples of incomplete partial albinism those cases in which a person may have one iris of lighter colour than the other. To do so is to strain matters a little, for it has been shown that in nearly every instance the eyes of one parent have been different in colour from those of the other, and the lighter coloured iris of the patient is merely the expression of his descent from one light-eyed parent.

The author quotes 15 cases of complete and one case of incomplete albinism with full notes on each case.

Four pages of bibliography of albinism terminate a contribution which is perhaps the fullest ever written on the subject, and which is very interesting reading, but from its nature of not strikingly practical value.

WILFRID ALLPORT.

TRANTAS (Constantinople). **Superficial Keratitis in the Exanthemata.** *Revue d'Ophthalmologie*, Aug., 1907.

IN 1901 Trantas published his observations upon the condition of the cornea in cases of measles seen at Constantinople. He found superficial punctate keratitis to be a very frequent symptom of the disease; it was present in 76 per cent. Morax, in 1903, stated that he had carefully examined 27 cases of the disease in Paris, and in these he had found no sign of such corneal disturbance. On the contrary, he constantly found "a hypersecretion of the glands of the ciliary margin" which produced small grey masses; these were deposited upon the corneal epithelium, and suggested the lesions described by Trantas.

Trantas now returns to the subject with an imposing array of cases. He says he cannot suppose that the discrepancies between his own observations and those of Morax arises from any difference in the type of measles as seen in Paris and

Constantinople, and his observations have extended over several epidemics in which there were variations enough to exclude accident; further, he has found various corneal lesions in exanthemata other than measles and also in acute skin affections from other diseases, such as pemphigus, syphilis and eczema. He gives a detailed account of his manner of examining the corneal epithelium, by staining with fluoresceine and eosine, and the examination of the stained surface with the corneal loupe.

His second series of measles cases comprises 125, seen in epidemics occurring in 1901, 1902, 1903 and 1904. In these the lesion was present in 86 per cent. Repeated examination of cases where the initial result was negative sometimes showed the appearance of the symptom at a later date, and, including these, the incidence of the symptom reaches 90 per cent. Most frequently both eyes were affected.

The corneal symptom occurred at varying periods of the fever: in three cases on the first day, 12 times on the second, 14 on the third, 14 on the fourth, 14 on the fifth, 10 on the sixth, 13 on the seventh, 8 on the ninth. Once it did not appear until the seventeenth day.

He describes the lesion as minute disseminated points (about 0.5 mm.), usually few in number, sometimes in the centre of the cornea, at other times in the periphery, but sometimes seen faintly over the whole area. The epithelium is rarely cloudy, except where there is photophobia or other sign of irritation. Sometimes fine lines may be detected in the cornea giving the appearance of quilting. The sensibility of the cornea is not affected: the visual acuity is not diminished save in the rare cases where there is a central confluent lesion.

He believes that this lesion is the corneal expression of those changes in the skin which are constantly associated with the febrile attack, and that they explain the frequency with which grave corneal lesions follow the action of this exanthem. Either the sequelæ are a direct continuation of the earlier lesion, or else that lesion prepares the way for the graver affection.

He concludes that the punctate keratitis of measles is distinctive of this disease, and that it may be possible to find changes in the cornea peculiar to each of the exanthemata.

Recently Comby (*Traité des Maladies de l'Enfance*) has recorded the observation of similar lesions in several cases of

measles; and the reviewer, in conversation recently with a physician who has an unusually large experience of measles, found that, though unaware of the work of Morax or Trantas, he was well acquainted with the form of keratitis described by the latter.

In a further section of this paper Trantas describes corneal affections noted in acute papular syphilis, in pemphigus, in varicella, in eczema and in polymorphous erythema.

N. BISHOP HARMAN.

DEUTSCHMANN (Hamburg). **My Serum.** *Beiträge zur Augenheilkunde*, August, 1907, Heft 69.

DEUTSCHMANN gives in this paper of fifty-four pages an account of a serum introduced by himself and obtained from rabbits or other animals fed on yeast. A considerable amount of work has been reported during the last few years on the treatment of various diseases by yeast. Diabetes was one of the first in which it was used, and it was believed that a certain amount of fermentation occurred in the intestinal tract so that a greater quantity of carbohydrates might be permitted in the dietary. Yeast has also been used in the treatment of boils and streptococcic infections, skin diseases and disturbances of digestion. It has been applied locally in leucorrhœa by a number of gynecologists, and very favourable results have been reported.

From the résumé of the literature of experimental work, with which Deutschmann opens his paper, the following may be mentioned:—Macfadyen (1901) found that the blood serum from animals which had been inoculated with a yeast extract caused the agglutination of yeast cells. Sanfelice (1902) obtained a serum with specific anti-substances to blastomycetes. Wlajew (1901), with a serum from geese into which the saccharomyces hominis had been injected tried the treatment of malignant tumours with encouraging results. Attempts to differentiate the yeasts by agglutination methods were unsuccessful. Rabbits, after having subcutaneous injections of yeast, were found to be immune to staphylococcus and streptococcus. Deutschmann repeated the last experiments with rabbits and goats, but found that nodes developed at the site of inoculation, and that the animals rapidly lost weight. The serum obtained from them gave very unsatisfactory results.

Thinking that the reason for the failure lay in the absence

of certain undefined chemical processes in the digestive tract, he thereupon determined to introduce the yeast by the mouth. While some were apparently none the worse, with other animals the feeding with yeast had to be stopped on account of diarrhoea and rapid emaciation. Even that failed to prevent the death of the animal in some instances. This super-sensitiveness as described by Deutschmann resembles, although it is not identical with, the Theobald Smith phenomenon, especially where he speaks of sudden death of the animal when the feeding overstepped a fixed limit, and where no sufficient cause for death could be discovered *post-mortem*. Eventually after a series of experiments each rabbit of 3,000 grammes weight was treated according to the following rules:—The animal was given $\frac{1}{4}$ gramme of sterile yeast thrice on the first day: $\frac{1}{2}$ gramme thrice on the second day: $\frac{3}{4}$ gramme thrice on the third day: 1 gramme thrice for the following four days: and on the eighth day a single dose of 2 grammes in the forenoon, while the blood was withdrawn in the afternoon, and the serum obtained under the usual precautions.

Deutschmann carried out thereafter experiments in which virulent cultures of staphylococci, streptococci, pneumococci, or tubercle bacilli were introduced into the anterior chamber of the eyes of rabbits, while yeast was administered: with a control series in which it was omitted from the dietary. Without giving a detailed account the author states that the result was milder and less disastrous in the first series than in the second. For example, when the process went to panophthalmitis in the control animal, there was a slight staphyloma formed in the yeast-fed animal. He concludes therefore that feeding with yeast not only raises the resisting power of the individual, but it has also a favourable effect on inflammatory processes. The average dose was 1 gramme of yeast per day for each kilogramme of body weight. It was not safe to give more for the reasons referred to above. These experiments were repeated on other rabbits, but instead of feeding the animals with yeast 1 ccm. or in some cases 2 ccm. of serum from yeast-fed animals was given per day by subcutaneous injection to each full-grown rabbit. This method surpassed the former in rapidity, certainty and safety to the general health of the animal.

As one would expect, the serum is not more bactericidal than normal serum to the staphylococcus, streptococcus,

pneumococcus and the tubercle bacillus. Other experiments prove that it does not agglutinate yeast cells; nor any of these four organisms taken from cultures. Lastly, its opsonic index did not differ from that of normal serum. Given by subcutaneous injection to normal individuals, there was no reaction apart from a slight sensation of warmth, nor any effect on the temperature. It was repeated daily for three weeks, and thereafter for several months twice weekly without producing ill-effects. Erythema or urticaria followed the injection in a few instances, a characteristic of antitoxin serums. The so-called serum disease which may occur after a long-continued employment of any serum can be guarded against by omitting treatment for a few weeks in the course of treating a chronic disease. The following method for discovering the point at which a serum treatment should be interrupted is due to Wassermann. Place a mixture of equal parts of serum from the blood of the patient and of normal serum from the same type of animal as that from which the special serum is being obtained, in an incubator at 37°C. If an opacity develops the patient is not capable of absorbing that special serum at the time. When no reaction occurs between the two in the mixture, the treatment may be resumed.

Deutschmann claims that his serum is an antipyretic. Apart from a vague description of some cases of pneumonia and one case of puerperal fever which do not prove anything, there is no evidence for this statement. The amount administered should vary according to the severity of the disease or the height of the fever, and the age of the patient. Children may be given 0.5, 1, or 1.5 ccm., and adults 4, 6 or 8 ccm. twice or thrice a week. He recommends the breast or the sides of the abdomen as the best places for the subcutaneous injections.

Deutschmann devotes thirty pages to short accounts of a large number of cases treated with his serum. They are almost entirely ocular conditions. He obtained satisfactory results in hordeolum. It must be here again noted that he lays special stress on the value of the serum in affections due to the four organisms already referred to, in particular the pneumococcus, and the tubercle bacillus. Ulcers of the cornea, whether simple (traumatic) or phlyctenular, reacted rapidly. Several cases of pannus-like opacities accompanying episcleritis cleared up very well, although it should be noted that the treatment included the usual local remedies. One failure is

noted in this group, but as the patient had both syphilis and diabetes, it was to be expected. A case of recently-formed anterior synechia following an ulcer and accompanied by signs of sympathetic irritation (for which another ophthalmic surgeon desired enucleation) recovered so well that an iridectomy could be performed to prevent a staphyloma developing without recrudescence of the symptoms.

The author states that he has treated fourteen cases of hypopyon ulcer with the serum and had satisfactory results. Only one failure is reported, but as the patient refused admission to hospital and returned at irregular intervals he need scarcely have been included in the series. There are other two cases described (one with and one without hypopyon), in both of which the actual cautery was applied prior to serum treatment. The cautery appears to be much more freely employed in some continental *cliniques* than it would be in our own. That is, of course, a side issue. The point to which attention is being directed is that the serum was not given in these two cases until the fourth or the fifth day, although it had been in use in the *clinique* for at least eighteen months previously. In the case with hypopyon the improvement set in apparently two days after the perforation, coinciding with the institution of the serum treatment. Many of the severe cases of *ulcus serpens* only commence to show an improvement a day or two after perforation has occurred in spite of the use of cautery and sometimes of the Saemisch section. The author himself says that he has come to the conclusion that the serum should be employed from the outset, and the cautery omitted, but without giving any examples of ulcers treated thus.

Three cases of parenchymatous keratitis are described. They had each been treated by mercurial inunction, etc., without improvement, and while one was believed to be syphilitic the others were suspected to be tubercular. The opacities cleared very well after serum injections. The highly satisfactory results of this method, used in addition to local therapy, are related in a considerable number of cases of plastic iritis, serous iritis, and iridocyclitis, tubercular, traumatic, and post-operative. The opacities on the cornea, the lens, and in the vitreous cleared more rapidly than by any other treatment. More attention may be given to the two instances of sympathetic iridocyclitis, which are described with considerable detail. They both followed iridectomies for

increased tension, one a case of acute glaucoma and the other extensive anterior synechia from a perforated *ulcus serpens*. Other surgeons had desired to enucleate, but the vitreous opacities and the posterior synechiae completely resolved with the injections, so that full vision was obtained. Favourable results are given for chorio-retinitis, optic neuritis, and atrophy following neuritis.

Deutschmann's theory of the action of his serum is interesting. He claims that it is different from all other yeast sera in that the yeast is introduced by the mouth and not by subcutaneous injection. It cannot therefore be agglutinative for yeast cells. Neither can it be directly bactericidal from its method of production, and such was found to be the case by experiment. Deutschmann here intercalates the remark that Darier reports the cure of streptococcus and gonococcus infections by the injection of antidiphtheria serum. That does not invalidate the theory of specificity of antitoxins, since specificity refers to a chemical and not to a biological reaction.* Deutschmann's theory may be stated thus:—As the result of digestive processes following the introduction of yeast into the alimentary canal some unknown substance is absorbed into the blood, and is not used so long as the animal is healthy. If now a bacterial toxin enters the animal system an anti-substance is produced through certain living cells throwing off receptors of a specific nature. If by exhaustion of the cells insufficient antitoxin be produced the animal succumbs. The unknown substance circulating in the blood of the yeast-fed animal supplies fresh energy to these cells so that they are again capable of producing antitoxin. In the same manner the serum supplies energy to similar cells in the patient. Deutschmann adds that the serum should therefore be administered early before exhaustion of the cellular energy. As the source of anti-substances is still unknown, except possibly for tetanus toxin, this theory cannot be put to experimental proof. It is curious that the serum seemed to be more useful in absorbing opacities and exudates than actively antitoxic or bactericidal, and Deutschmann seems to have felt this, as he also experimented with a view to obtaining a serum combining an antitoxic effect with his yeast serum, but without success.

* *Manual of Bacteriology*, Muir and Ritchie, 4th Ed., 1907.

The serum may be obtained from the Serumlaboratorium Ruete-Enoch, Hamburg, in 2 ccm. flasks, at a cost of 2.20 mk.

W. B. INGLIS POLLOCK.

V. MORAX (Paris). **The Treatment of Superficial Pneumococcal Affections of the Globe by means of Rabbit's Bile.**

Annales d'Oculistique, November, 1907.

NEUFELD, who was probably the first to record the bacteriolytic action of rabbit's bile, states that if to 2 cc. of a culture of pneumococcus in bouillon kept at 37°C. for 24 hours, one adds a small amount of rabbit's bile, the culture clears rapidly, and at the end of a certain time the bouillon can be demonstrated to be free of any activity, tested microscopically, by culture or by inoculation. He adds that bile from the rabbit is decidedly more active in this way than bile from man, dog, rat or goat. This matter has been further investigated by others, especially Nicolle and Adil Bey, who have shown that it is in the biliary salts that the activity lies, and have arranged them in order of efficacy.

One of the most destructive diseases to which the eye is liable is ulcer of the cornea caused by the pneumococcus, and while this is in many cases amenable to treatment by the cautery and other means, in really bad and advanced cases one would be thankful for any further assistance in treatment. Gabrielides seems to have been the first to put in practice clinically this information gained from laboratory work regarding the action of the bile. He has treated cases of hypopyon ulcer with success with the bile of both rabbit and sheep. Morax has made attempts in a few cases of pneumococcus infection to investigate further into the value of the new application. He usually employed the bile just as it was, but taurocholate of soda in 2 per cent. solution makes another convenient application of similar nature. His first case was one of conjunctivitis of pneumococcal origin with abundance of organisms; these were greatly reduced in numbers in one day by the use of bile. In another case of pneumococcus infection, this time in the form of an ulcer of the cornea in a man of 54, along with other treatment, two instillations of bile were employed, and the process of advance was checked, repair began almost at once, and healing proceeded rapidly and satisfactorily. One or two other similar cases are related in which the beneficial effect of the bile was quite evident, and

then an example of hypopyon keratitis due to the bacillus pyocyaneus, in which bile had absolutely no effect, unless perhaps that of increasing the pain.

The fact that in the cases related Morax employed other customary therapeutic means detracts of course to some extent from the value of these observations, considered from the point of view of mere experimental tests of the action of bile, but Morax very justly points out that he does not regard bile as a panacea, but as a useful adjunct to other means, as an important therapeutic agent, not as supplanting all others, but assisting them. Thus, the organism causing hypopyon ulcer of the cornea, though it lies in the superficial layers, it is true, may yet be deep enough to escape to some extent the bacteriolytic action of the bile; therefore he employed light curettage before instillation. The atropine, too, has so decidedly an analgesic effect that he did not care to omit the use of it as well. Besides, the influence of the bile is but transitory, and the antiseptic action must be kept up. He considers, further, that if we can limit the sphere of action of the cautery, that most invaluable agent, we may have smaller and fainter opacities resulting. Evidently the application of bile caused a very considerable amount of smarting pain, which lasted from one to several hours.

W. G. S.

R. TERTSCH (Vienna). **Anterior Polar Cataract.** *v. Graefe's Archiv für Ophthalmologie*, lxvi.

It is well known that the formation of anterior polar cataract is most commonly the result of perforation of a corneal ulcer, which allows of the apposition of the anterior lens capsule to the posterior surface of the cornea. This ulcer, however, need not necessarily be a central one, but may be situated peripherally, and in some cases it may not have perforated at all.

Opinions, however, vary as to the mode of origin of this form of cataract, for some have maintained that the epithelium may be directly stimulated to proliferate, while others again hold that proliferation of this layer is preceded by some destruction of these cubical cells or of cortical lens fibres. In this country Treacher Collins, who has fully described this variety of cataract, believes that the contact of the lens with the cornea produces an arrest of osmosis of the nutrient fluid,

which leads to a breaking down and shrinking of the lens fibres in the neighbourhood: as a consequence of this shrinkage the tension of the overlying capsule is released, thereby allowing direct proliferation of the epithelium without any preceding destruction.

Tertsch here describes a number of cases that came under his observation. In two cases, where perforation of a central ulcer of the cornea occurred, an anterior polar cataract was observed to appear within five days after the anterior chamber, which had been abolished for only three days, was restored. In some other patients the ulcer was situated towards the periphery of the cornea, and its perforation was followed by the formation of a polar cataract: all the cases occurred in early life, and with one exception all were due to an "eczematous" inflammation.

Three cases were examined microscopically. Two of these showed only a mass of round or spindle-shaped cells with little or no intercellular substance and an absence of broken-down lens fibres in the mass: they did not exhibit any evidence of a previous destruction of epithelium, and were evidently in an early stage of formation. The third case, which was of three weeks' standing, showed much more advanced changes in both epithelium and cortex. In it there was found a mass of spindle-shaped cells with elongated nuclei in long rows, with clear intercellular substance and clumps of amorphous material which was apparently broken-down cortical fibres: the epithelium had in parts stretched over the posterior surface of the cataract, but was nowhere accompanied by a capsule. He concluded that there had been here a great destruction of epithelium, probably after it had become detached, before regeneration had set in.

In one case of ophthalmia neonatorum where the corneal ulcer had not perforated Tertsch found only a fine cortical cataract without any change in the epithelium. This observation led him to institute a series of experiments on rabbits in order to find out how far ulceration of the cornea without perforation can bring about the formation of a polar cataract. He found here that it was only when severe iridocyclitis with exudation into the anterior chamber supervened that changes occurred in the lens. These changes, which in most cases consisted of a detachment and destruction of the epithelium with breaking down of the lens fibres, he attributed to the

inflammation and exudation; in this connection it may be noted that anterior polar cataract due to prolonged iridocyclitis has also been observed in human subjects.

The different results which Tertsch obtained from his observations led him to the conclusion that the mode of origin of anterior polar cataract is not the same in all cases, but varies with the cause. It greatly depends on the severity of the infection in the eye interfering with the proper nutrition of the lens. In the cases where the infection has been severe, and a purulent iridocyclitis is present, there is usually at first a breaking down of the epithelial cells, apparently often preceded by a detachment of this layer either from the capsule or from the cortex, and this is followed by an active proliferation of the epithelium.

In those other cases, however, in which some weaker form of irritant is at work without any great implication of the uveal tract (*e.g.*, the irritation of contact and arrest of osmosis, or the presence of a posterior synechia over the site of the cataract, as in one of the cases examined microscopically), there is direct proliferation of the epithelium without any previous breaking down.

The fibres of the cortex, like the epithelium, are affected by a severe infection, and sometimes they suffer first; and when the cortex breaks down simultaneously with the epithelium and becomes partly closed in by the subsequent ingrowth of the cubical cells, it is found to form part of the anterior polar cataract.

It may, in conclusion, be noted that Tertsch also favours the idea of the presence of a mechanical factor in those cases where this form of cataract follows on perforation, as has been advocated by others. According to this view the lens becomes suddenly pushed forward when the perforation occurs, and its anterior surface suddenly more convex, especially at the pole when the corneal ulcer is a central one. In this way the fibres may become separated from each other, thereby forming spaces at the anterior pole, and the epithelium may become detached from the capsule. Such a condition would favour the formation of a polar cataract when other factors, such as arrest of osmosis or the action of toxins, or the presence of iridocyclitis affecting the resistance of the cortex come into play.

THOS. SNOWBALL.

SEGSEL (Munich). **Blindness Due to Thrombosis of Cerebral Sinuses following Phlegmonous Tonsillitis.** *Klinische Monatsblätter für Augenheilkunde*, August-September, 1907.

SEGSEL'S patient was an artilleryman, twenty years of age. The clinical report may be thus summarised in the author's own words:—"Well-marked right-sided exophthalmos with swelling of the lids and chemosis of the conjunctiva, coming on rapidly, simultaneously with an acute phlegmonous inflammation of the right tonsil, with pain in the head, rigor and vomiting. Almost simultaneously blindness and fixed pupil in the right eye, quickly followed by the same condition, but without exophthalmos, in the left eye. Two days after the occurrence of the right-sided exophthalmos, painful swelling of the right side of the neck and the appearance of a hard cord, corresponding in its position with the internal jugular vein."

The cornea was not anæsthetic. A small ulcer appeared on the tenth day, attributed by the author to the mechanical lagophthalmos. At the time of the first examination the disc margins in the right eye were indistinct, but this was merely temporary. Herpes labialis appeared on the seventh day.

Tonsillitis, fever and headache recurred at intervals during the next few months, but six weeks after the onset of the illness the exophthalmos had entirely disappeared. The corneal ulcer had healed leaving a nebula and some posterior synechiæ. The pupils were dilated and fixed.

Ophthalmoscopically, there was atrophy of both discs. The right eye remained totally blind, while the left eye could count fingers at one metre. The left field of vision was represented by a small area in the upper nasal quadrant.

From the detailed report it appears that symptoms of tonsillitis only manifested themselves four days after the occurrence of the head pain, but the author supposes that the latter obscured the pain of the tonsillitis. A diagnosis of secondary thrombosis of the cavernous sinus and orbital veins was arrived at, and the tonsillitis assumed to be the primary lesion. Segsel explains the course of the disease by the following sequence of events:—Tonsillitis giving rise to thrombophlebitis of the palatine vein of the same side, which extended into the internal jugular vein, thence *viâ* the inferior petrosal sinus into the cavernous sinus and ophthalmic veins

of the right side; right-sided exophthalmos due to obstruction of the blood-stream in the superior ophthalmic vein; extension of thrombosis through the circular sinus to the left cavernous sinus.

Nine previously recorded cases are summarised, and on that basis an attempt is made to establish the relation between the exophthalmos and the thrombosis.

The cause of the blindness in the author's own case is discussed at some length. Having excluded thrombosis of the central retinal vein (Mitvalsky), rise of intra-orbital pressure of the right side, right-sided exophthalmos due to obstruction from swelling and infiltration of the orbital tissue (Knapp), and direct involvement of the optic nerve by swelling of the orbital tissue (Schmidt-Rimpler), he says we must look for an intra-cranial cause. This cause he locates in the thrombosed cavernous sinus, which may injure the chiasma or the intra-cranial part of the optic nerve, either by compression of nerve fibres, by setting up neuritis, or by interruption of the blood supply to these parts. The quick onset of complete blindness, and the termination in pure optic atrophy suggest that the last of these is the cause of the blindness. The chiasma gets its blood supply from several sources, while the intra-cranial segment of the optic nerve is supplied only from two. Further, according to Henschen's scheme, the uncrossed fibres which correspond to the portion of the field of vision preserved in Seggel's case, form a compact bundle in the lower aspect of the intra-cranial optic nerve, while in the chiasma these uncrossed fibres are mixed with crossed fibres. Hence a vascular lesion in the former situation would be more apt to leave this particular group of uncrossed fibres intact than a similar lesion in the latter situation.

Thus the author concludes that the blindness resulted from obstruction to the blood supply to the intra-cranial portion of the optic nerve.

The subject of treatment is briefly discussed.

A. J. BALLANTYNE.

L. GOURFEIN-WELT (Geneva). **Myxœdema and Associated Ocular Lesions.** *Archives d'Ophthalmologie*, Sept., 1907.

CASES of myxœdema complicated by optic atrophy and contraction of visual fields have been recorded by various observers.

Wordsworth, in 1884, published a case of myxœdema and

double optic atrophy, but subsequently admitted that the case was probably one of acromegaly.

Uthoff, in 1897, recorded the case of a girl aged 15, who showed absence of the thyroid gland, optic atrophy with temporal hemianopia, and polyuria. The skin was not infiltrated, and the patient's intelligence was normal. Uthoff tried to explain the condition by the theory that the want of development of the thyroid gland had caused a compensatory hypertrophy of the pituitary body.

Wagner described the case of a girl aged 26, suffering from myxœdema with left optic nerve atrophy, and showing hemianopia with neuro-retinitis in the right eye. Thyroid extract cured the right eye completely and influenced the left slightly.

Sanesi, in 1899, recorded the case of a man who gradually developed myxœdema. Later bi-temporal hemianopia supervened with persistent headache. This case was cured by thyroid extract.

Mayer, in 1906, published a case of myxœdema accompanied by bi-temporal hemianopia, which he explained by the theory of compensatory hypertrophy of the pituitary body.

The authoress publishes the case of a woman aged 47, suffering from symptoms of both myxœdema and acromegaly. The patient complained of failing sight during the preceding twelve months. The hair and teeth had commenced to fall out, her hands had become much larger and features coarser. Her voice had changed, and memory become defective. The skin, including that of the eyelids, was thick and infiltrated. The left eye was blind, and the right showed temporal hemianopia and vision of $\frac{6}{12}$. Under thyroid extract very great improvement resulted in all the symptoms. The vision of the right eye improved to $\frac{6}{6}$, and the temporal field returned above and below, leaving only a large median scotoma. Even the blind left eye showed a little vision below.

From these cases the authoress believes that there exists some definite relation between the thyroid gland and the pituitary body. Histologically, the large lobe of the latter presents some resemblance to that of thyroid tissue. Experimentally, Ragovitz has shown that extirpation of the thyroid gland causes pituitary hypertrophy. Hofmeister has demonstrated that the removal of the thyroid and parathyroids causes death. If, however, the parathyroids are not removed till some time

after the thyroid the animal will survive. This may be explained by hypertrophy of the pituitary body in the interval. Pathologically, Boyce and Beardles in two cases, and Bournvill and Brisson in one case, of myxœdema, found post-mortem evidence of hypertrophy of the pituitary body with atrophy of the thyroid gland. Clinically, cases occur which at the same time resemble acromegaly and myxœdema, and it is important to know that all the symptoms of both diseases, if taken in time, may clear up under thyroid treatment.

A complete bibliography accompanies the text.

E. W. BREWERTON.

THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED
KINGDOM.

Thursday, January 30th, 1908.

The President, Mr. MARCUS GUNN, in the chair.

CARD SPECIMENS.

Sections from a case of Sarcoma developing under Calcareous Plate.—

Mr. E. E. Henderson.

Twenty years previously the right eye had lost all useful vision as a result of a blow; there was no pain or discomfort of any kind.

The iris was tremulous, discoloured, and adherent to the shrunken opaque lens, the tension was lowered, but the cornea was clear and there was no scar. On the upper and inner side of the globe a distinct nodule could be seen.

The eye was excised and the orbit exenterated. On section the eye showed the cornea clear, a small cataractous lens and the retina detached. There was calcareous degeneration of the choroid, and extending from the optic nerve to the equator was a flattened mass of new growth covered by a calcareous plate; a little behind the equator the sclerotic was perforated by the growth, most of which was extra-ocular. The tumour proved to be a spindle-celled melanotic sarcoma. *A new form of Scotometer.*—Mr. P. C. Bardsley.

This instrument, which was exhibited, is adapted for taking the field of vision up to 30° from the fixation point. It consists of a concave disc, which can be revolved round its centre, and having small test objects 2 to 4 m.m. in diameter, white or coloured, moving along a slot in the disc. The fixation point, a small white disc in the centre, is perforated so that the patient's eye can be controlled by the observer from behind. The movements of the disc and test object are all performed from behind, so that there is nothing to distract the patient's attention. It is provided with a suitable chin rest and other accessories.

A case of Buphthalmos apparently cured by the performance of Iridectomy.—Mr. S. Stephenson.

Lily W., aged 7 years and 9 months, was first seen at the North Eastern Hospital on October 24th, 1900, when the child was found to be the subject of bilateral buphthalmos which had existed since birth. The family history showed nothing of importance, but as an infant the child gave distinct evidences of inherited syphilis. Fourteen days before coming under observation there was some mucopurulent discharge from both eyes; and on examining the cornea it was found to measure 14 mm. transversely, the anterior chamber was deep, the tension was raised, and the optic disc cupped. Mercury was given internally and myotics locally until January 27th, 1901, when the condition was practically unchanged, and the tension was +1.5 to 2. An iridectomy was then performed on the right eye, followed some months later by one on the left; and from that time the tension became normal and has remained so ever since. The last examination, made on January 2nd, 1908, showed the same measurements of the cornea, and the vision was $\frac{6}{36}$.
Essential Shrinking of the Conjunctiva of 12 months' duration.—

Mr. Hosford.

M.D., male, came for treatment on October 29th, 1907, complaining only of slight itching and pain in the lower eyelids, with some small amount of discharge. The patient lost the sense of smell 8 years ago. The sub-epithelial tissues of both eyelids showed fibrous contraction with some vertical bands, and the fornices were obliterated. There were no evidences of bullæ either locally, nor in any part of the skin or mucous membranes.

Right Hemiplegia with Obstruction (? Thrombosis) of the Left Common Carotid and Central Artery of the Retina, with perception of Light in the Eye.—Dr. L. Guthrie and Mr. M. S. Mayou.

J.S., aged 7, was run over by a cab on July 17th, 1906, several ribs on the left side being fractured. On July 21st there was pneumothorax on the left side with rise of temperature. On July 23rd there appeared hemiplegia of the right side of the body and aphasia, and the sight of the left eye was lost. On November 3rd, 1907, there was still some paresis of the right side of the face, as well as of the arm and leg of the same side; the tendon reflexes were exaggerated and there was extensor plantar response. The facial paralysis was of the supra-nuclear type, and the tongue deviated to the right, while there was slight motor dysphagia and verbal amnesia.

Although pulsation could be distinctly felt in the suprasternal notch and over the right subclavian, there was no impulse over the line of the left common, external, or internal carotids, nor of the left facial

or temporal arteries. There was a presystolic cardiac murmur. The right eye was normal in every respect, but the left was divergent, the pupil only acted consensually, and there was no perception of light. When first admitted there was some vision remaining on the temporal side of the field. Ophthalmoscopic examination showed the media clear, the disc atrophic with vessels much reduced in size. The retinal veins appeared thrombosed and had white lines along them, and on the disc was some attempt at formation of new channels. On the temporal side of the disc was a white area of old exudation extending out towards the macula, which was itself pigmented. The choroidal vessels showed no change.

The case suggests an extensive thrombosis involving the large vessels in the neck and leading to the occlusion of the middle cerebral artery and arteria centralis retinae; but another suggestion, by Dr. Guthrie, is that the left carotids are congenitally absent, and that an embolism of the central artery of the retina has occurred in the usual way, while the escape of the ciliary vessels is also somewhat in favour of this view.

Sympathetic Ophthalmia.—Mr. C. Wray.

This case was exhibited a year ago, and since that time a further relapse occurred, which recovered in a short time under treatment with acetozone. Mr. Wray brought forward the case because the anterior chamber was shallow, the tension raised, and there was almost total posterior synechia; and he wished for an opinion as to the advisability of performing an iridectomy.

A case of Optic Neuritis.—Mr. Harvey Goldsmith.

A girl, aged 20, came under observation with the history of having suddenly lost the sight of the left eye 6 weeks ago. The vision in the right was $\frac{6}{6}$ and that of the left $\frac{6}{60}$; refraction emmetropic.

The right eye showed hazy media, blurring of the edge of the disc, both arteries and veins distended, the latter being in places constricted while in others their course was concealed by patches of exudation. There were no hæmorrhages and no gross vitreous opacities. The left eye showed much the same changes, and at the macula was a translucent grey area about the size of the disc, over which the retinal vessels passed.

The media had become much more opaque since the last examination, 14 days ago, which made the above details rather difficult to determine.

PAPERS.

Carcinoma of the Orbit, originating in a Meibomian Gland.—Mr. Simeon Snell.

This was the case of a woman, aged 63, in whom a small tumour of the upper lid appeared 10 years ago. It was removed in 1904, removed

again with a portion of the lid in 1905, but in 1906 it was found necessary to excise the globe and exenterate the orbit; in October, 1907, however, the orbit was filled with a large growth, and there was involvement of pre-auricular and cervical glands. It was a spheroidal-celled carcinoma.

Coloboma of the Iris in each eye, occurring in five generations.—

Mr. Simeon Snell.

Mr. Snell showed a family tree in which 12 members (5 male and 7 female) out of a total of 41, extending over 5 generations, exhibited a coloboma of the iris. The defect was the same in all cases, viz., downwards and outwards, confined to the iris, the choroid not being affected, and situated quite peripherally so that the edge of the lens was visible. The patient, Mrs. R. H. (senr.), who came under Mr. Snell's observation, and whose mother had been affected, had children by two husbands, and in both branches of the family there were found members who had the same deformity; and it is also remarkable that the only two affected members of the younger generation were females, and the subjects of complete aniridia.

*Microphthalmos resembling Glioma with Lenticonus and Hypertrophy of the Ciliary Body.—*Mr. M. S. Mayou.

T.B., aged 6 months, came to the Central London Ophthalmic Hospital on June 23rd, 1907, under Mr. Hancock, with the history that the left eye had been small from birth; there were no other deformities and no sign of syphilis.

Right eye normal, the left an obviously small eye with persistent pupillary membrane. Behind a clear lens was seen a yellowish-white reflex with vessels running in front of it, but there were no inflammatory signs.

The eye was enucleated, and on section the ciliary body and processes were normal, but behind them, lying on the pars plana, was a large mass, consisting of pigmented and unpigmented cells, evidently derived from the epithelial cells of the ciliary body, and showing in some places an attempt at an alveolar arrangement. The retina lay thickened and folded behind the lens, and consisted mostly of neuroglia tissue with no definite structure. There was a coloboma of the choroid below. The lens showed (posterior) lenticonus with distortion of the posterior fibres, the nucleus was situated centrally, and there was no posterior vascular capsule. The vitreous was merely represented by a few filaments directly behind the lens, and there was no trace of the hyaloid artery.

The interesting points about the case are, first, the clinical appearance of pseudoglioma in a microphthalmic eye not associated with persistent hyaloid; secondly, the lenticonus, and thirdly the hypertrophy of the ciliary body.

There was no evidence of inflammation, and Mr. Mayou regarded the case as one simply of arrested development.

Epithelial hypertrophy in association with microphthalmos is extremely rare, but has been described before by Bock, Mayou, and Lafon.

Optic Neuritis in Cerebral Tumours.—Mr. Leslie Paton.

Mr. Paton based his observations on records collected from 252 consecutive cases seen at the National Hospital, Queen's Square, in 148 of which the presence of tumour was verified by operation or autopsy.

Optic neuritis was present in 125 cases, 12 had only slight neuritis, while 27 were already in a condition of post-neuritic atrophy when first seen. In 38 cases optic neuritis was entirely absent, the large majority of these occurring in subcortical and pontine tumours; when, however, subcortical tumours did develop neuritis, it generally indicated that the growth had involved either the grey matter of the cortex or the grey matter of the base, and in the case of pontine tumours that the cerebellum had become implicated. In tumours of the cerebral cortex, Mr. Paton showed that the intensity of the neuritis seemed to vary inversely with the distance of the growth from the anterior pole of the middle fossa, while the nature of the growth appeared to have very little influence on the development of optic neuritis.

With regard to the differences in intensity of the optic neuritis as indicating the side on which the tumour was present, Mr. Paton's figures suggested that no reliance could be placed on this sign; for although the preponderance was somewhat in favour of the more severe neuritis being on the affected side, yet in some cases it was more marked on the opposite side. The macular changes often seen in intense cases of optic neuritis were in all probability due to an overflow of œdematous fluid from the swollen disc into the nerve fibre layer. The temporary attacks of blindness, often observed in these cases, were probably caused by a sudden rise of intra-ventricular pressure, which, by bulging the thin floor of the third ventricle, pressed directly on the chiasma; that the cause is not to be found in the eye itself was shown by the fact that this symptom has been noticed in cases where optic neuritis was absent.

Mr. Paton dissented from the opinions that the neuritis in these cases was due to descending inflammation, to pressure in the vaginal space, or to the influence of toxins; and was inclined to regard the so-called optic neuritis as simply a manifestation locally of a general œdema of the cerebral tissues due to irritation set up by the tumour.

MALCOLM L. HEFEURN.

A CASE OF CHIASMA LESION, WHICH IMPROVED UNDER THE ADMINISTRATION OF THYROID EXTRACT.

By J. HERBERT FISHER, M.B., B.S., F.R.C.S.,
*Ophthalmic Surgeon (with charge of Out-Patients), St.
Thomas's Hospital; Surgeon, Royal London Oph-
thalmic Hospital (Moorfields).*

IN *Brain*, Vol. xxv., Part 2, p. 341, a case is recorded by Richardson Cross under the heading "A case of Acromegaly under observation for five years, with charts of the field of vision." The patient, a young man, 23 years of age, showed the typical general symptoms of acromegaly. When first seen the left visual field presented a large scotoma in the upper part of its temporal half, and the direct vision of this eye, with myopia corrected, was $\frac{6}{24}$; the right eye had a full visual field, and direct vision was $\frac{6}{9}$, with correction of myopia. Two years later the left eye had only p.l.: the right had v.= $\frac{6}{18}$, with large loss of field on the temporal side. Both optic discs were pale and atrophic. The patient was then treated with two thyroid tabloids, each equivalent to 5 grs. of fresh gland, *per diem*, and fresh thymus gland was also ordered. Under this *régime* marked improvement in general symptoms was soon observed: three months later the treatment was altered to two tabloids of pituitary extract, and one of thyroid extract daily: and five months later again the patient was ordered to take three pituitary and two thyroid tabloids daily. In nine months the patient was reduced in weight from 16 st. 7lbs. to 13 st. 8lbs. After regular treatment on these lines for over three years the field of each eye had become almost full when tested with a large

white spot; there was, however, still a slight loss in the right periphery of each field: while the direct vision of the right eye was practically normal, that of the left was not better than counting fingers at 1 metre. The discs still presented a pale and atrophic appearance; the general health of the patient was excellent. The defect of fields which persisted was regarded as due to slight continued pressure on the left optic tract, maintaining an incomplete homonymous hemianopia.

It will be observed in the above highly interesting and successful case that the pituitary body tumour involved the chiasma, nerves and tracts asymmetrically: it inclined to implicate the structures to the left side first; at a later date it involved the decussating fibres from the right optic nerve; these latter under treatment almost fully recovered; the macular fibres from the left eye were permanently damaged; the abiding visual symptom, a partial right hemianopia, could be best explained by slight implication of the left optic tract.

In view of the unfortunate results which are apt to attend operations on pituitary body tumours, and the progressive tendency of cerebral surgery, the above well-reported case of successful treatment deserves to be supported by any other allied cases which can be adduced. The case which has been under my own observation and treatment, and which I desire here to report, is very similar to that of Richardson Cross and equally satisfactory in its results. Again it is a case of a young adult male patient: the asymmetry of onset of the visual symptoms is very much akin to that of the case recorded by Cross: when first I saw the patient, who however presented none of the general signs of acromegaly, one eye

was practically blind and the other visual field was typically that of a complete hemianopia: the nasal half of the field of one eye was alone preserved. The history of the patient, however, was definite and trustworthy; he was quite certain that the sight of the eye which was now blind had first gone from the temporal side of its field: it was by the history, therefore, in my case that the site of the lesion in the region of the chiasma was located: in Cross's case the visual defect came, at an earlier date, under his skilled observation and its amount and progress are recorded and charted; moreover, Cross's patient presented the general symptoms of acromegaly.

I treated my case with thyroid extract alone; no thymus or pituitary extract was given. Anti-syphilitic treatment had been very thoroughly carried out before the patient came to me, and during this treatment the eyes had progressively deteriorated: there was not the slightest suspicion of congenital syphilis nor of any acquired venereal disease. Allowing for the fact that the fibres of one optic nerve were probably atrophic beyond recovery my case appears to show that thyroid extract alone is an adequate remedy for some forms of pituitary body hypertrophy, and that the products of the pituitary body and the thymus gland are, in some cases at least superfluous; it seems therefore to carry us a very short step further in the treatment of such patients; that administration of thyroid products will supply the economy with something which the pituitary gland, by excessive efforts, is endeavouring to provide, appears to be a simple explanation of the good effects of this treatment; it would be interesting to know whether pituitary extract will cure the symptoms of myxœdema, or have any effect

in cases of simple hypertrophy of the thyroid gland—if there were any good results obtained by such converse clinical experiments, the associations between the two glands and their functions would be brought still closer.

Cases of myxœdema accompanied by bi-temporal hemianopia have been described, in which a compensatory hypertrophy of the pituitary body has been invoked to explain the visual defect, and in some cases *post-mortem* examination has confirmed the accuracy of this explanation. Experimental extirpation of the thyroid gland has been shown to cause hypertrophy of the pituitary body in animals. Clinically, cases presenting symptoms which are a complex of acromegaly and myxœdema have been observed, and early treatment with thyroid extract has been successful in causing the disappearance of the mixed symptoms.

It is interesting to observe that of the two lobes of which the complete pituitary body is formed the posterior is developed as a hollow downgrowth from that part of the embryonic brain which afterwards becomes the third ventricle; it is the anterior lobe, the part which abuts on the optic chiasma, which, like the thyroid gland, is developed as a tubular expansion from the ectoderm of the buccal cavity; in its microscopic structure the anterior lobe of the pituitary body approaches closely to that of the thyroid body, and it is known to develop a similar colloid substance.

F. H., male, æt. 26, is the fourth child of a family of five, all of whom are living and in good health; none have any defect of sight. The patient had always had good sight, and up to two years before he came to me had been a good shot. Two years before I first saw him he

had been laid up with an attack, which was called influenza, for five weeks; in this illness he suffered from severe general headache, and was said at times to have been light-headed; he experienced no vomiting or vertigo; there was no ear trouble.

Eighteen months before I saw the patient he began to observe for the first time a defect in his sight: this, before long, stopped him doing his work as a labourer, and he expressly informed me that it prevented him from seeing people when they passed him "on the left-hand side." He was also certain that when he closed his right eye and looked straight in front of him he was unable to see any objects on his left, but could see clearly on his right side. At this time he became an in-patient of a provincial hospital for five weeks, and was treated with inunction, with pills and with iodide of potassium. The sight of the left eye grew rapidly worse, and was practically *nil* at the date he was discharged from the hospital: for two months he attended the same hospital as an out-patient, and then resumed work. The eyesight, however, steadily deteriorated, and he was shortly compelled to give up work, and again attended the hospital for seven weeks; he soon found that he could no longer see anything to his right side. He first came under my care in March, 1906. The above history of the case was elicited. He said also that he had had vertical headache of some severity, and some tenderness at the back of the neck in the suboccipital region, rather more marked to the right than to the left of the middle line. He was a man of medium height, and well-developed; the hands were somewhat large and broad, but were nothing exceptional for a labourer; there were no general signs of acro-

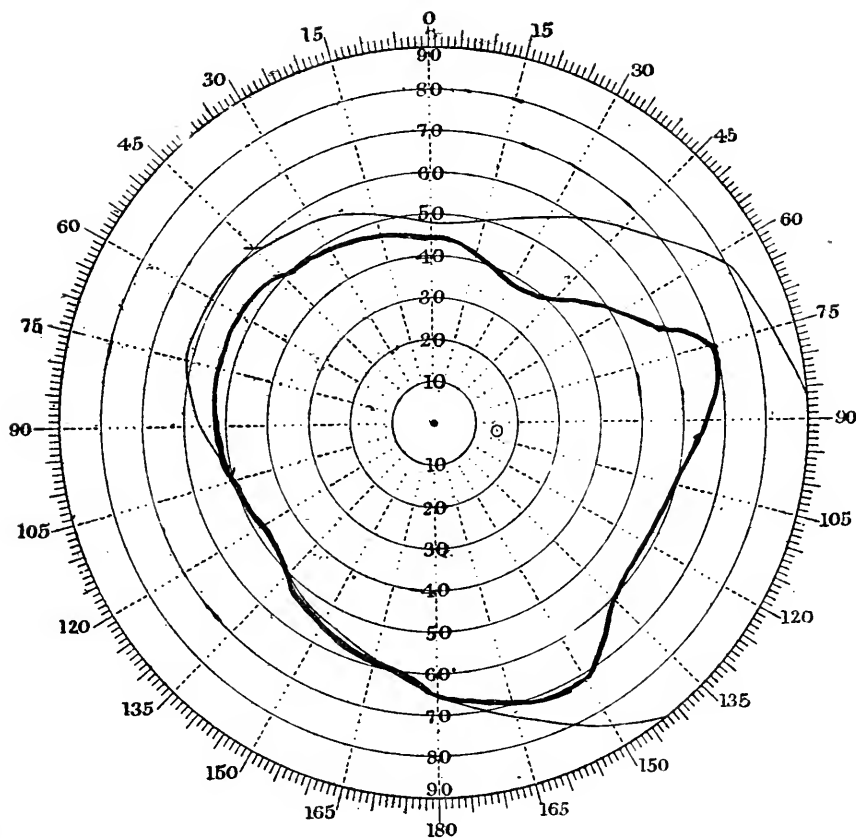
megaly whatever. The vision of the right eye was $\frac{6}{24}$ partly; the left eye had no perception of light. There was well-marked pallor and obvious atrophy of each optic disc; the right appeared practically as pale as the left; there was no evidence of any antecedent papillitis. The left pupil was inactive to light, but acted indirectly with the right pupil; the latter gave also a direct response when the light was concentrated on the temporal side of the retina. The field of the right eye was charted on the perimeter, and was of the typical hemianopic type, the line of demarcation between the seeing temporal half and blind nasal half of the retina being the usual sharp almost vertical line passing in immediate contiguity to the fixation point. I regret to say that the copies of this field have gone amissing. All other cranial nerves were carefully investigated, including the olfactory nerves; all appeared to be in perfect order.

As regards any evidence of general nerve disease, there was none. The knee-jerks were normal; neither Romberg's sign nor Babinski's sign was present; there was no clonus; the gait was natural. No loss of sensation to touch, pain or heat in the limbs; no intention tremor. All organs of the body were carefully examined and found to be healthy. The nose and its accessory sinuses were examined for me by a thoroughly competent rhinologist, but nothing abnormal was found.

I treated the case with five grains of thyroid extract, twice a day, beginning on March 21st, 1906. I soon allowed him to return home, making arrangements for the thyroid treatment to be continued. It has been carried on, with only occasional interruptions, for two years. In August, 1906, the headaches had entirely ceased, and he had

started work. On November 7th, 1906, the right vision had improved to $\frac{6}{9}$ partly. Its field of vision was taken and found to be as shown in the chart. There was still

Field 1

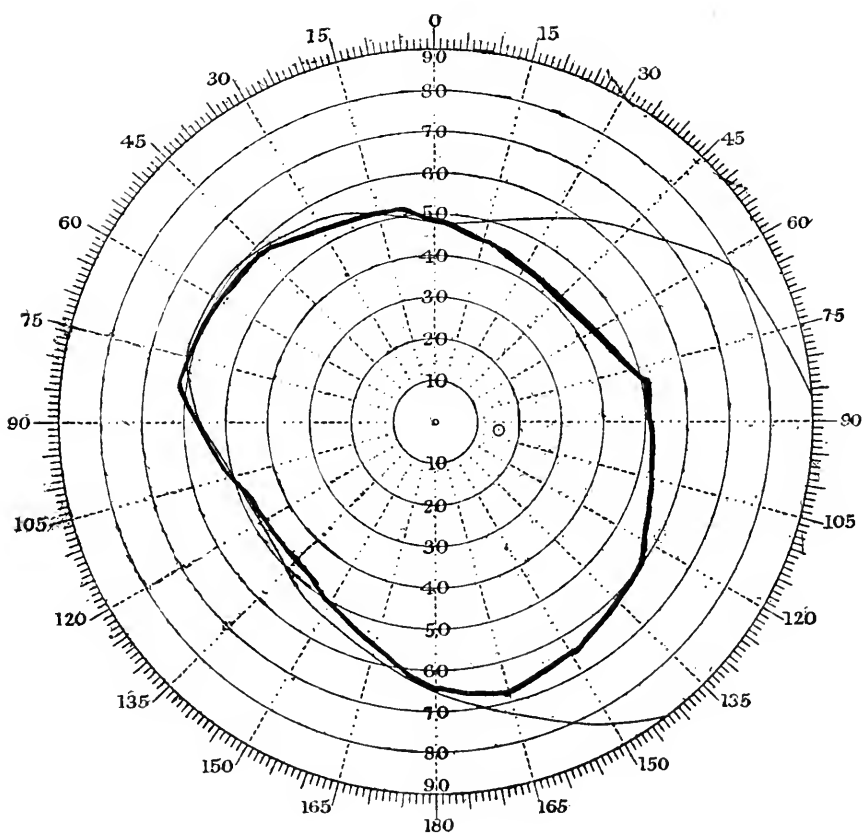


some loss in the temporal periphery, but except for what had been previously observed it would hardly be recognised as the remnant of a hemiopic field. On December 19th, 1906 he read five out of the six letters in $\frac{6}{9}$. In spite

of the great improvement in general symptoms, direct vision and perimetric field of the right eye, there was no recognisable improvement in the colour of the right optic disc, while the left disc remained completely atrophied, and this eye recovered no sight.

I examined the patient thoroughly on March 11th, 1908. The left eye had just p.l.; the right read $\frac{6}{9}$, almost

Field 2.



fully; its field is attached; it is, as charted, not quite so full in the upper temporal direction as it was 16 months ago. He had ceased the thyroid tabloids for a month at Christmas time, but otherwise had taken them practically continuously for two years. He suffers now from no headache, works as a labourer, and at piecework earns as good wages as his fellow workmen; is able to wheel barrows along planks, and is continually doing so. The patient has never shown any signs of myxœdema. The thyroid gland is not obvious either by inspection or palpation. Each disc is the subject of conspicuous primary atrophy: though the right is perhaps not quite as pale as the left, one would certainly hardly anticipate the eye to retain such good vision as it possesses. The patient married in June, 1907. His wife has not been pregnant, but he expressed to me the hope that he would raise a family. Impotence is, I believe, not uncommon in association with pituitary disorders, but I did not push my enquiries further in this direction.

AN IMPROVED FORM OF ARTIFICIAL EYE.*

By KARL GROSSMANN, M.D., F.R.C.S.E.,
*Consulting Ophthalmic Surgeon, Stanley Hospital,
Liverpool.*

I HAVE very often felt the desirability of rectifying the one great shortcoming which exists in a large number of artificial eyes, that is, the sunken appearance of the eye itself, which generally gives the secret away at the first

* Paper read before the Ophthalmological Section at the Annual Meeting of the British Medical Association, August, 1907.

glance. The Snellen eye is a considerable step in the right direction, as far as the conjunctiva is concerned. The irritation caused by the sharp edge of the old glass eye is practically eliminated, and by its use we avoid the frequent occurrence of chronic traumatic conjunctivitis which so often leads to complete flattening of the conjunctival fornix, especially in the lower lid, and which may render the socket quite unfit to hold an artificial eye. The Snellen eye does not, however, help us with the sunken appearance of the upper lid.

For some time back I have been making models in wax, adding to the procurable glass shell a protrusion corresponding to the part of the lid that sinks in most, and I have tried to have these models carried out in glass by giving them to various retailers of artificial eyes. But invariably the answer came, "It cannot be done." It was only recently that I succeeded in getting hold of an excellent working glass-eye blower, who was not only willing to comply with my wishes, but pleasantly surprised me by showing me some glass eyes made practically as I wanted them.

The eyes shown in Fig. 1 are all right eyes, and all have the protrusions at the upper margins. These protrusions are placed where the lids sink most, and have to be adapted to each individual case. The eye is a hollow compressed ball with no sharp edge. When required the back wall can also be made to bulge out, as shown in Fig. 2, where the three upper glass eyes are seen from the back, and the three lower ones in profile, showing the protuberances towards the back of the socket. I have always been uncompromisingly in favour of simple enucleation and not for Mules's or similar operations. The idea of having a foreign body implanted in living tissue chemically not indifferent to it is absolutely unsurgical, and could at best be tolerated under exceptional circum-

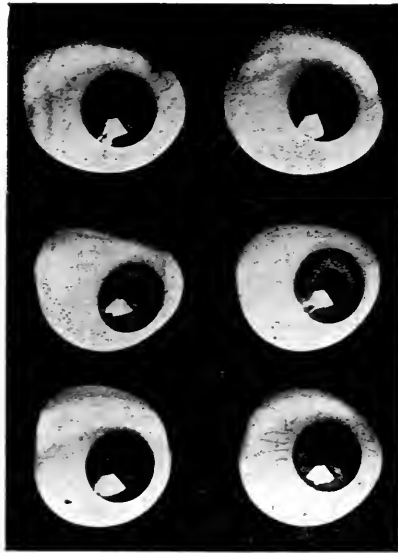


Fig. I.

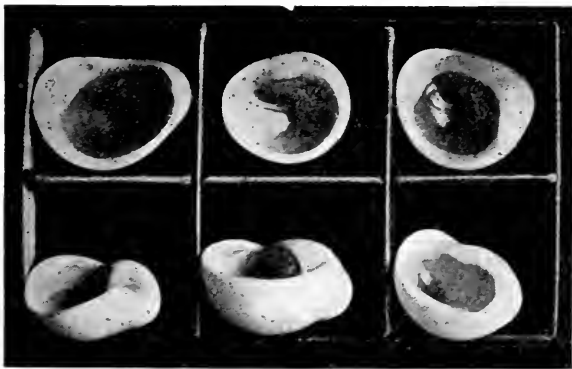


Fig. II.

stances only. In my opinion, the great point is that each eye required should be made by the glass-blower with the patient present. The former can then not only match to

perfection the colours of the iris as well as of the sclerotic, but he can at the same time satisfy the requirements of the socket, which is at least equally important both for comfort and appearance.

The ordinary glass-eye seller, with his stock of badly fitting shells, has no *raison d'être*, and the sooner this is acknowledged by the profession the better for our patients. Every single anophthalmos artificialis has been under surgical treatment, and may always be instructed by his surgeon where to go for his glass eye. And every ill-fitting artificial eye will henceforth be a discredit to the attending ophthalmic surgeon who does not send him to a competent glass-eye blower. The question of cost need not come into consideration. The demand for artificial eyes is not great, and will not give employment to more than one or two individuals in the country. If every ophthalmic surgeon in the United Kingdom were to keep a special record of his enucleation cases, notifying the number to some centre, the various localities could then be mapped out and the glass-blower might take district by district, taking each place once, twice, or oftener in a year. The glass-blower would personally see the colour of the patient's eye and the surgeon might mention any point he would like specially noticed, and this at a very reasonable rate, especially if several eyes should be required. Possibly we may fix on some such centre under the auspices of the British Medical Association. In no case must we, through sheer indifference, allow our patients in future to drift into the hands of the ordinary glass-eye retailer. The appearance of the one-eyed is often of the greatest commercial value to him or her, be he or she clerk, workman, or servant. And the damage to the conjunctival sac due to a badly fitting glass eye is a thing for which we are morally to blame, if we can get hold of a competent glass-blower.

A PORTABLE REFRACTOMETER
AND A
PORTABLE ASTIGMOMETER.*

By KARL GROSSMANN, M.D., F.R.C.S.E.,

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Liverpool.*

THE correct determination of refraction is becoming more important from day to day. The struggle with outside competition has forced this country to a higher degree of activity than was customary in the middle of the Victorian era, and closer application to work has required a more strenuous use of the visual organ. Thereby, the very frequent occurrence of ametropia in this country has been revealed not only among adults, but among children. This has led to the outcry about the appalling deterioration of the race—a perfectly incorrect statement, called forth by the existing love for sensationalism and by the unwillingness to acknowledge the up to then prevailing ignorance of the state of affairs. We are beginning to outlive this transition stage, and to recognize that the best means of fighting deterioration is its prevention; and this applied to vision means the early correction of any ametropia that may exist and can be corrected. This work, if to be well and thoroughly carried out, can be neither easily nor quickly done, and of course cannot be done by competent experts without adequate remuneration.

The public, never so happy as when trying to procure something for nothing, has in its gullibility become an easy prey to the advertising spectacle-seller, who offers

* Paper read before the Ophthalmological Section at the Annual Meeting of the British Medical Association, August, 1907.

his "advice"—which he declares to be both competent and scientific—gratis, making the public pay for his outlay in advertisements, etc., by the price of his wares.

To a great extent the medical profession is to blame for this state of affairs, by having allowed the public to drift into the hands of the spectacle-seller. The general practitioner, as a rule, knows little about refraction, and the ophthalmic surgeon finds it difficult to get time for refraction work, especially at the hospital. In the eye departments of some of the largest hospitals in the country the surgeon does not attend to refractions for want of time. This is indefensible, because if there be any justification for a medical charitable institution, *all* eye troubles should be attended to in its ophthalmic department. Want of time should be no excuse: if necessary, more than one surgeon should be available, and, if need be, should be paid for the work he does.

In the examination of refraction fatigue of the examined eye is a fertile source of mistakes. Any means of facilitating and shortening the time of examination must therefore be welcome. The smaller the amount of fatigue to the examined—and, be it not forgotten, also to the examining—eye, the better will be the result obtained. Having done refraction work for more than twenty-five years in an unusually large out-patient department, I at an early date used an arrangement of lenses which enabled me to examine refraction very rapidly by skiascopy. The idea of putting a series of glasses together in a circular disc or a straight row is not new and was first applied for ophthalmic purposes in the refraction ophthalmoscope, the modifications and varieties of which are legion. For skiascopy the straight rows have been used with preference, though not exclusively. *But in order to shorten examination for refraction we must emancipate ourselves altogether from the spectacle trial*

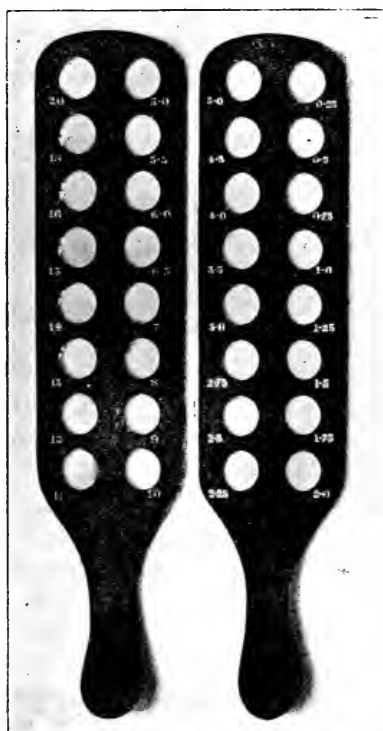


Fig. I.

case and once and for all restrict its use to its legitimate limits. This I accomplish by the following two instruments:

1. THE REFRACTOMETER (Fig. I.).

It contains, in contradistinction to all preceding instruments of a similar kind,¹ *the complete series of spherical*

1. *British Medical Journal*, May 29th and June 13th, 1903, p. 1092 and p. 1380.

glasses of the spectacle case, in 2 frames of 16 glasses each :

0.25	5.0	5	20
0.5	4.5	5.5	18
0.75	4.0	6	16
1.0	3.5	6.5	15
1.25	3.0	7	14
1.5	2.75	8	13
1.75	2.5	9	12
2.0	2.25	10	11

The glasses are arranged from 0.25 to 5 downwards in one vertical row, from 2.25 to 5 upwards in the adjoining vertical row, these 16 forming one frame. The other frame begins again with 5, where the first frame left off, and with the useful addition of 6.5 goes downwards to 10, and then from 11 to 20 upwards in the adjoining vertical row completes the series as found in the spectacle case; one pair containing the convex and the other the concave *spherical* glasses. The arrangement is such that the frame is moved up along the nose and then turned back to front and moved down again, thereby avoiding any criss-cross turning when going from one glass to the next. The diameter of the glasses is $18\frac{1}{2}$ mm., large enough to be used both for skiascopy and for subjective examination (sight testing).

By the completeness of the series this refractometer does away with the spectacle case, as far as the spherical glasses are concerned, and a great saving of time is effected by obviating the necessity for taking out and putting back the glasses from the spectacle case. Moreover, the examined eye is in a position to compare the effect of the different glasses almost instantly, the change of glasses before the eye being possible within a fraction of a second. And, last but not least, there is no fingering

of the glasses, either on the part of patient or examiner, so that they remain clean, permitting their refractive effect to be full and undisturbed without the necessity for cleaning or wiping.

Only after having thus found *subjectively* the best correcting spherical glass, first for one and then for the other eye, does the time for using the spectacle trial case arrive. We put the glasses found correct for each eye together in the spectacle frame and verify the result. Here again no unnecessary fingering of the glasses of the spectacle trial case takes place.

There still remains the large number of astigmatic eyes, and here the spherical refractometer is only of limited utility. While with its help we can objectively—that is, skiascopically—determine the principal axes of the existing astigmatism at a glance, and also its amount for the two extreme meridians, it fails us completely for the subjective examination—testing of vision: and we should still be obliged to recur to the spectacle trial case, which is ever so much more cumbersome and tedious for astigmatic work than for purely spherical cases.

2. THE ASTIGMOMETER.

These inconveniences ultimately became so irksome to me that they induced—I may say forced—me to arrange some practicable device which completely fulfils my wants. Similar in appearance to the refractometer, the astigmometer (Fig. II.) contains *all the cylinder glasses of the ordinary spectacle trial case*, 36 in number, distributed in two frames, one containing the 18 convex, the other the concave cylinders. They are again arranged in two vertical rows, beginning from the top 0.25 downwards to 2.25, then from the base of the adjoining row 2.5 upwards to 6.

0.25	6
0.5	5.5
0.75	5
1	4.5
1.25	4
1.5	3.5
1.75	3
2	2.75
2.25	2.5

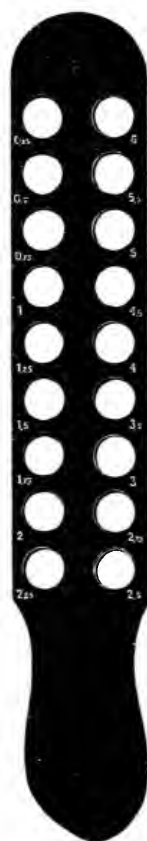


Fig. II.

The glasses are of the same diameter as in the refractometer—namely, $18\frac{1}{2}$ mm. Each glass is mounted in a circular toothed mount (Figs. III. and IV.). The teeth (Fig. VI. *T*) do not go down the whole thickness, but leave a smooth flange (Fig. VI. *F*) which fits into the frame (Fig. III.; in section, Fig. VII.). Between the rows of toothed mounts and gearing into them is placed a toothed rod

(*D*, Fig. III.). This rod is moved up and down by a knob (*K*), thereby rotating all the mounts round their centres. Fig. IV. gives an alternate mode of rotating the mounts by means of a screw thread and a milled knob (*M*). It will be noted from this arrangement that when the rod (*D*, Fig. III. is moved, all the glasses in the left vertical row turn in one direction, while those in the right column rotate in the opposite direction, and this for the following purpose:

When the principal meridian of astigmatism has been approximately found by skiascopy, the instrument is held with the most likely glass before the eye, and the axis put in the right position by moving knob and rod accordingly. This done, all the other glasses are at once in position, and can be placed before the eye by simply moving the frame up or down. This for the one vertical row. Should the required glass be in the other row, the instrument is simply turned round its longitudinal axis, back to front, and owing to the symmetrical rotation of the mechanism all the cylinder glasses of this row are again in correct position. The reversing of the instrument is necessary—the same as in the spherical refractometer—because it has to be passed with its edge along the nose, so as to allow the glass to be properly placed before the eye.

The execution of the instrument has been troublesome. I have approached the likeliest instrument makers in this country and abroad, but met with the greatest discouragement. Of the technical objections, the chief one was that the friction of eighteen toothed wheels would be too great for the toothed rod to work at all. This objection, I am glad to say, has been shown to be completely without foundation. I have had the instrument made in brass and in other materials. In brass it works very well, although it is rather heavy. In the latest model the

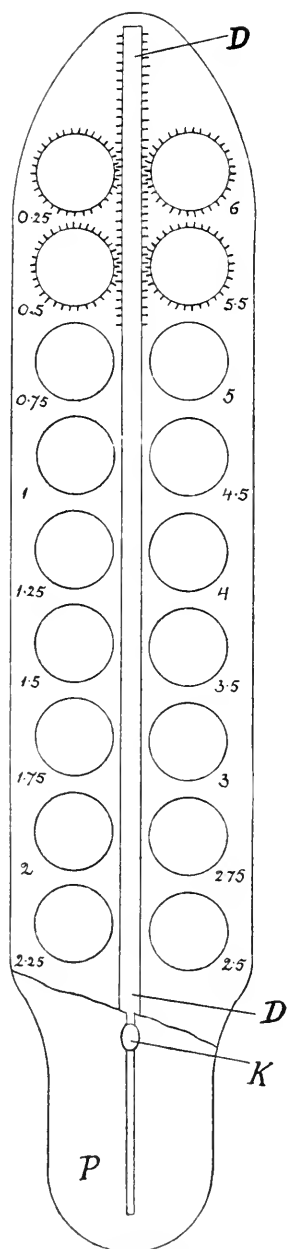


Fig. III.

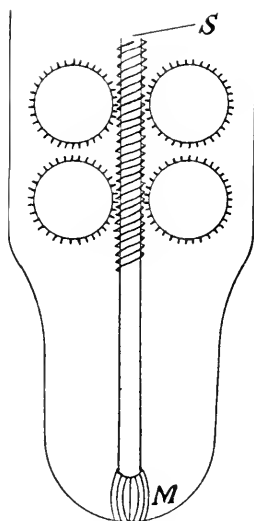


Fig. IV.



Fig. V.

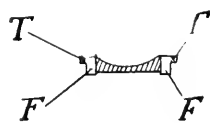


Fig. VI.

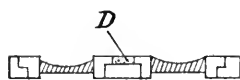


Fig. VII.

frame is made of wood, which answers excellently. The mechanism works so smoothly that it is a pleasure to use it. One of the greatest difficulties was that the instrument must be so light and smoothly running that it can be worked equally well with either hand singly, back and front.

Both refractometer and astigmometer are portable. They are not intended to leave the hand of the examiner.

I take this opportunity of pointing out that there seems to be a generally accepted notion that skiascopy requires a minimum distance of at least one yard or more of examiner from examinee. Is it really necessary for me to say that this is a fallacy? When recently demonstrating my instruments to an ophthalmic surgeon, he could not understand that skiascopic examination can be carried out at 18 in. distance, as well as at two yards. He told me he had never heard of such a thing, and I suspect that in his inmost heart he did not quite believe me. I have not the time to-day to go into particulars about skiascopy, and must leave this to another occasion.

I have tried to solve the problem of a portable refractometer for both spherical and cylinder glasses by means of a system of glasses at variable distances from each other, and have arrived at a satisfactory conclusion theoretically. There are, however, too many reflecting surfaces, and the single lenses in the form I have shown here are infinitely superior for practical work. For this purpose the instruments have been devised to suit my personal requirements.

The numbers of the glasses are marked on both sides. For use in the dark room the vertical column carrying the weaker glasses will be specially marked in the spherical refractometer. The astigmometer has the axes marked not only on the glasses, but also on the mounts, on both sides.

I have to thank the makers of the refractometer, Messrs.

Priest and Ashmore, of Sheffield, for the interest they have taken in its production. As for the astigmometer, I had to go to Germany where the mechanical difficulty of overcoming the friction of the eighteen wheels has been solved in such an admirable manner by the maker, Mr. Sydow, of Berlin, that no praise of mine is needed.

REVIEWS.

W. UTHOFF (Breslau). **Observations on Anomalies of Growth, associated with Temporal Hemianopia, in Disease of the Hypophysis Cerebri.** *Bericht des Ophthal. Gesellschaft, Heidelberg, 1907.*

IN the *Berliner klinische Wochenschrift*, 1897, Uthoff published an article on Visual Disturbance in dwarfed and overgrown patients, in reference to the symptom of temporal hemianopia in affections of the pituitary body. Among the cases then reported was that of a girl, aged 14 years, with atrophic pallor of the optic papillæ and temporal hemianopia, whose stature and general physical development were those of a child of nine. Among the symptoms were headache and polyuria. No localising cerebral symptoms and no defect of intelligence. The thyroid gland was atrophic, and the patient emaciated. No signs of acromegaly. The patient died away from hospital, and no *post-mortem* examination was made.

A contrasted case was that of a boy, aged 16 years, who from his fourth year had shown very abnormal growth, and since his eleventh year had been known in his neighbourhood as the "boy-giant." Subsequently, and in addition to the general overgrowth, the characteristic features of acromegaly became manifest. Temporal hemianopia was first discovered when the patient was thirteen. *Post-mortem* examination confirmed the diagnosis of tumour of the pituitary body.

To these observations Uthoff now adds those of three cases of much interest. In the present paper he draws attention rather to the anomalies of growth,—not typical acromegaly—associated with disease of the pituitary body, than to the ocular symptoms in such cases.

CASE I. A boy, aged 14, under observation since he was 7. Five months before admission to the Hospital he had convulsive attacks, loss of consciousness and vomiting; during the attacks great thirst and polyuria. The cerebral symptoms passed off in a few days. Defect of sight had been noticed for some time, but became much greater after the onset of the head symptoms. When first seen by Uhthoff, in 1900, the right eye had vision= $\frac{1}{5}$; left, hand movement in nasal field. The optic discs were pale and atrophic. Fields of vision were limited to a small area in each lower nasal quadrant. Other symptoms were polyuria and polydipsia; urine free from albumen and sugar. The diagnosis given by Dr. v. Mikulicz was that of atrophy of thyroid gland, incipient myxœdema, and vicarious hypertrophy of the hypophysis.

The most noticeable features were an abnormal and excessive development of the panniculus adiposus, and a pale, puffy appearance, not quite like that of true myxœdema. The boy's weight at the age of 7 was 68 lbs. Under treatment by thyroid gland the weight dropped to 57½ lbs. and the general condition improved, but relapsed upon cessation of treatment. In 1901 the weight was 79 lbs. The sight of the right eye was maintained, but that of the left had been wholly lost.

An unsuccessful attempt was made to implant healthy human thyroid. When æt. 14, the boy weighed 150 lbs. and was enormously fat. He showed no disturbance of brain or nervous system, and had not the characteristic signs of acromegaly, although his feet were abnormally wide and thick.

CASE II. A girl, 8 years old, with an exceptionally large head, and features of adult type. Hands and feet were not larger than usual. There were very marked general adiposity, most noticeable in the mammary region. She had always been "an unusually strong child." Hearing and intelligence were good. V., R. and L.,= $\frac{1}{12}$ and Sn. 1. Temporal hemianopia, complete in L., incomplete in R. Optic papillæ pale and atrophic. The thyroid gland could be felt, but excessive fat prevented accurate palpation. Examination by X-rays gave no evidence of bone change, or calcareous tumour in the sella turcica. The case is probably one of benign tumour of the pituitary body, possibly of congenital origin.

CASE III. Female, æt. 20 years, a pale, very undersized woman, with an unusual development of panniculus adiposus. No signs of acromegaly. V. R.=fingers at 5 m. L.=fingers at 3 m.

R. field shows characteristic temporal hemianopia. L. field is limited to a small sector in the upper nasal part. Pupils show hemianopic reaction. Optic papillæ atrophic, pallor most marked in temporal part.

Death occurred 3 months later. The post mortem examination revealed a large adenoma occupying the region of the pituitary body; the optic nerves were scarcely distinguishable. Thyroid gland rather small. The panniculus adiposus was 6 cm. in thickness.

The most prominent feature, in the three recent cases, in addition to the visual disturbance (temporal hemianopia, with atrophy of the papillæ) was a general and abnormal fatness. In the two first cases (children, æt. 8) there was an unusual bodily growth, a moderate degree of gigantism, but not a genuine acromegaly. In the third case, the excessive fatness was associated with retarded growth. The patients' intelligence was not materially affected, and there were no indications of myxœdema or cretinism.

Uthoff asks if the association of temporal hemianopia, obesity and abnormal bodily development justifies the diagnosis of a tumour in the region of the pituitary body. He thinks it does.

General fatness in its relation to affections of the pituitary gland has been freely discussed since about 1880, though as early as 1841 Mohr recorded a case of tumour of the hypophysis cerebri (verified by *post-mortem* examination), and drew attention to the unusual obesity of the patient. In 1887 Story reported a case of temporal hemianopia with general cerebral symptoms and remarkable stoutness, and since that date a large number of observations pertaining to such cases have been recorded.

Most authors agree in considering the tumour formation as the etiological factor in the production of the abnormal fatness in these cases. Some (Erdheim, Selke and Bartels) found the hypophysis unaffected, and are inclined to refer the symptoms to irritation of some part of the brain by the tumour. Uthoff thinks it more probable that injury of the pituitary body by pressure is the explanation, in instances in which the gland is not involved in the new growth.

The question, to what extent other intra-cranial tumours may give rise to similar trophic disturbances, has been frequently discussed. Anton points out that something similar does occur in tumours of the cerebellum, and E. Müller thinks that the link between these groups of cases is to be found in the bulging

of the floor of the third ventricle, and pressure upon the hypophysis.

Obesity as a symptom in lesions of the hypophysis cerebri other than tumour seems to have been seldom noticed, but such lesions are very uncommon.

Uhthoff records his experience as follows:—

"I have met with about 40 cases of temporal hemianopia from disease of the optic commissure: 7 undoubted cases (with 3 autopsies) associated with anomalies of growth, *i.e.*, 18 per cent.; acromegaly in 1 case: giant growth and acromegaly in 1: dwarfishness in 1: general corpulence with moderate giant growth in 2: general corpulence with retarded bodily growth in 1. I am, however, inclined to think that this percentage would have been higher if, when I began my enquiries, had paid more attention to the question of general trophic disturbances in temporal hemianopia."

Examination of the literature of the subject shows that general corpulence in consequence of tumours of the hypophysis occurs most frequently in young people. Uhthoff is of opinion that tumour of the hypophysis in the young undoubtedly leads to general disturbances in growth (dwarfishness or giant growth), not infrequently accompanied by general corpulence, but without actual acromegaly.

Brissand and Meige consider that hyperfunction of the hypophysis principally leads to giant growth in children, to acromegaly in adults, and in later life to thickening of the soft parts.

Reliable information as to the condition of the thyroid gland was only obtainable in two of Uhthoff's cases: once (Case 3) the thyroid was fairly normal, as seen *post-mortem*; and once (Case 1) it was found at operation to be greatly atrophied. Nevertheless signs of myxoedema or cachexia strumipriva were absent. In the third case the condition of the thyroid gland remained doubtful; but it was certainly not entirely atrophied. It does not seem justifiable in the first two cases to consider the disease of hypophysis a vicarious hypertrophy subsequent to degeneration of the thyroid gland. Uhthoff expresses his opinion that the phenomena of cretinism, cachexia strumipriva, and myxoedema associated with pathological conditions of the thyroid gland are not strictly comparable to the phenomena of dwarfishness, general

corpulence, etc., resulting from tumour of the pituitary body. In the first-named conditions, disturbances of vision with optic atrophy, temporal hemianopia, etc., are rarely, if ever, seen. In the latter they are constantly present.

J. B. L.

BOURGEOIS (Rheims). **On the Action of Mercurial Preparations in Non-Syphilitic Affections of the Eye.** *Receuil d'Ophthalmologie*, July, 1907.

THE author believes it to be incontestable that ophthalmic surgeons use mercurials very largely not only in syphilitic affections, but also in those where there is no suggestion of the taint; and that it is remarkable how numerous and how varied are the affections that are amenable to its action. He does not pretend to have solved the riddle of this action, neither can he give any precise indications where such treatment will be of service; but he considers that we should continue the habit of resorting to mercury when all else has failed, and that the practice is justified by its success. Moreover, where one mode of exhibiting mercury has failed another should be tried: the changes should be rung on inunctions, injections and administration by the mouth. Particularly in cases of irido-choroiditis, even when the history is negative and there have been no previous manifestations that would suggest the particular utility of a mercurial, mercury with salicylate of soda gives good results. One insists on this because many practitioners refuse to use it unless a syphilitic origin of the disease be manifest. Grasset insists on the same point with regard to disease of the central nervous system; and Schmidt-Rimpler in 1906 has similarly justified this medication in non-syphilitic eye diseases, particularly in the graver forms of iritis, iridocyclitis with hyalitis, choroiditis, optic neuritis, and tobacco or alcoholic amblyopia.

Bourgeois proceeds to narrate four cases showing much success from the treatment in cases where eyes were practically blind from various causes.

1. A case of sympathetic ophthalmia in a child following injury by a stone projectile. The wounded eye was excised,

but blindness overtook the other, so that the child could scarcely get about. Mercurial inunctions were continued for nearly three years, and at the end of that time the vision had risen to 0.6.

2. A case of single-eyed optic atrophy following influenza. From hand movement at 30 centimetres vision recovered to 0.2. The improvement followed rapidly upon the exhibition of mercury, but iodide of potassium was of no use.

3. A farmer lost an eye from injury with a piece of wood, severe sympathetic inflammation followed, and the vision was lost: in three months it recovered to 0.8.

4. A married lady of 36 years suffered an attack of severe headache and vomiting, and went blind immediately afterwards with double optic neuritis. The patient had had good health previously, but was nervous and impressionable. There was no suspicion of syphilis. Intra-muscular injections of biniodide of mercury were given daily. At the end of three weeks vision had improved to 0.8 in the left and 0.6 in the right eye: and the recovery had continued for the succeeding year. These are some of his successful cases, some, he says, were not successful.

The cases of sympathetic ophthalmia remind one of those published by Burnham of Toronto, who obtained not dissimilar results with his "combined treatment" continued for long periods. The last case seems by no means a fair example of the good influence of mercury, for similar cases have recovered with no other treatment than that of complete rest in bed and a slop diet.

Bourgeois then discusses the mode of action of the mercury. In active syphilis, he says, we may take it that the mercury acts as a germicide, in old syphilides as an antitoxin. As has been said of old, "le mercure tue la vérole, comme le soufre tue la gale." In the non-syphilitic cases he supposes there must be some toxin at work which is combatted by the mercury. How this is effected he cannot even guess. But it is admitted that mercury, no matter how administered, appears in the tissues either as the metal in an extremely fine state of division, or else as a double chloride of mercury and sodium with a molecule of albumen.

Zuccola (*Riforma Medica*, 1906) has shown that the leucocytes particularly carry it, and that it is most abundant

in their nuclei. He believes that this intimate association facilitates the antitoxic action of the mercury.

This explanation may very well serve to account for the diminution of a pathological process, but it will not account for the disappearance of the new inflammatory tissues already produced which are so particularly disastrous in eye and nerve affections. We might very well carry on the idea and suggest that with the cessation of the pathological process induced by the toxin the leucocytes are so invigorated by their incorporation of the mercury that they are as voracious in their appetite for low forms of recent granulation tissue as they are for the young and succulent tadpole's tail.

N. BISHOP HARMAN.

J. CHAILLOUS. **Contracture of the Levatores Palpebrarum with Paralysis of Upward Rotation and of Convergence. Lengthening of the Levators by Operation.** *Annales d'Oculistique*, October, 1907.

THE condition described in this communication is a very rare one. Chaillous and Chevallereau have recorded a previous case (*Annales d'Oculistique*, April, 1903), and Truc showed a similar case before the French Ophthalmological Society in 1906. In a note Chaillous states that Gowers appears to have been the first to record a case of this type.

The subject of the present paper was a woman 62 years of age. She was emotional, but beyond the ocular condition, presented no evidence of nerve lesion. The retraction of the upper lids had been present for three or four months. It was so great that the lids were entirely concealed beneath the somewhat swollen tissues of the orbital margin, and the eyes remained widely open even in sleep. They could barely be closed by the greatest voluntary effort. As regards the motility of the globes, there was complete absence of the movement of elevation and of convergence, but the lateral and downward movements were normal. The pupils acted normally.

Truc having had a good result from tenotomy in his case, the author determined to adopt a similar mode of treatment: and the following operation was performed:—An incision was carried across the entire width of the eyelid half a centimetre

above the upper edge of the tarsal cartilage. A grooved director was passed between the tendon and the conjunctiva, and the insertion of the tendon in the cartilage was cut through. A suture armed with two needles was passed through the levator where muscle joins tendon, and round this suture a vertical tongue was cut with its base near the lower edge of the tendon. By turning this tongue down and suturing it to the epitarsal tissue and to the lower edge of the skin wound the levator was lengthened. The result was satisfactory two months after operation, as shown unusually well in the photographs reproduced, and Chaillous suggests that such an operation might prove beneficial in some of the extreme cases of Graves's disease.

WALTER SINCLAIR.

THE
OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.
Clinical evening, February 13th, 1908,

Vice-President, Mr. TREACHER COLLINS, in the chair.

Case of Detachment of the Retina, treated by operation.—

Mr. Leslie Paton.

A man, aged 50, was hit on the right side of the face by a large squib 34 years ago; four years later the right eye was found to be defective. In July, 1906, he complained of mistiness before the left eye, most marked on the nasal side of the field. A year later the condition was much about the same, and he was admitted into Queen's Square Hospital. The vision of the right eye was then found to be counting fingers at 1 ft. on the temporal side of the field, and of the left $\frac{3}{60}$.

Ophthalmoscopic examination showed double detachment of the retina, that in the right involving the outer and lower part of the retina as far up as the optic disc, while in the left the temporal was the affected portion, and in the extreme periphery on the nasal side could be seen some old choroiditis. Some weeks later the case was transferred to St. Mary's Hospital for operation, and the following was the method of procedure.

A vertical incision was made over the external rectus of the left eye. 5 mm. behind its insertion; when the muscle had been exposed and cleared, a strabismus hook was passed, and utilized to pull the eyeball

forwards. On a level with the upper border of the muscle a longitudinal trough was burnt with the actual cautery through the sclera behind the equator, when some fluid escaped; a thin Graefe knife was then plunged through the retina, which presented in the opening; a similar puncture was made below, on a level with the lower border of the muscle. Three days later the field was restored, and on January 17th, 1908, it was still full and the vision $\frac{6}{18}$.

Monocular Buphthalmos with Mal-development of Iris.—Mr. Hosford.

In this case the left eye was noticed to be enlarged when the patient was 6 months old, and when seen at the age of 5, the left cornea measured 14·5 mm. horizontally and 12 mm. vertically, the anterior chamber was deep, the disc atrophic and cupped, tension +2. V. = Counting fingers only. R.V. with correction $\frac{6}{5}$.

In the affected eye the iris showed difference in pigmentation of its outer and inner part; that surrounding the pupillary margin was blackish-brown in colour, and occupied almost half the width of the iris; the peripheral portion was of a bluish-grey colour, clear in detail, with no atrophic appearance. The iris was slightly tremulous.

Mr. SYDNEY STEPHENSON considered this was a case of rather exaggerated ectopia uveæ, such as often occurred in old blind eyes.

Mr. PARSONS pointed out that this case dated from birth, and was of the type commonly described as congenital ectopia of the uvea. It belonged to a well-recognized group, though of a different pathological order from those cited by Mr. Stephenson.

The CHAIRMAN remarked that ectopia uveæ was usually seen in old glaucomatous eyes, and was associated with atrophy of the iris, the anterior portion of the stroma dragging the pigment round. The fact that this case exhibited so small a pupil made it clearly of congenital origin.

Lantern Demonstration on Primary Facts of Colour Perception.—

By Dr. Edridge-Green.

In connection with this subject Mr. Marshall observed that the whole subject of colour vision was extremely important, and that the recent report by a Committee of the Ophthalmological Society was necessarily incomplete, since they were unable to go beyond the question as to the efficiency or otherwise of Holmgren's test. He proposed "that a Committee should be appointed to investigate the whole question of colour blindness, to examine cases, and draw up a report setting forth the best method of testing for colour blindness."

This was seconded by Mr. Lang; but on the suggestion being made by Mr. Doyne to the effect that the work involved would be of almost too great a magnitude, Mr. Marshall subsequently modified it to include practically only the latter part, viz.: the investigation of the best method of testing for colour blindness. This resolution was carried.

An Orbital Case for Diagnosis.—Mr. J. F. Cunningham.

W.K., a girl of 15, was the second of a family of eight; the mother had had two miscarriages. In March, 1907, she had been ordered glasses; with these she saw $\frac{6}{6}$ in the left eye, while she only had perception of light in the right. In June, 1907, she began to complain of neuralgic pains in the right eye, and in the right side of face and neck, the attacks lasting 2 or 3 days. Very marked prominence of the right eyeball had been noticed by the doctor, which he said was much more evident in October, 1907, than in January, 1908, when she was admitted to St. Thomas's Hospital under Mr. Fisher. There was now a certain amount of divergence. The right pupil was inactive to light, though it responded consensually; some dulness of sensation was present in the first and second divisions of the fifth nerve. Ophthalmoscopically the right disc was slightly paler than the left, but there was no neuritis. Abduction and elevation in this eye was not so good as in the left. There was loss of weight and appetite, and Calmette's reaction gave a doubtful result.

Fundus Changes, the result of Injury at Birth.—Mr. J. H. Fisher.

This patient, a female, was first seen when 4 years old, in 1903, and the note made at that time was that while the left eye appeared normal, the right was microphthalmic to a moderate degree, had no perception of light, and "a limpet-shell-like mass of silvery blue connective tissue came forward into the vitreous from the side of the optic disc."

The case next came under observation on December 16th, 1907, when the same description would still apply to the condition of the right eye, with the addition that there were several narrow cicatricial bands radiating out from the base of the cone into the retina; there was hardly any trace of retinal vessels to be seen. The mother stated that she had had 10 pregnancies, none of which were completely normal, it being necessary to use instruments in every confinement; only 3 children had survived. This child was born with a large hæmatoma over the left frontal region, and damage resulted to the right eye and temple.

Mr. Fisher considered the ophthalmoscopic picture indicated serious injury to the optic nerve and vessels, and that hæmorrhage into the

canal of Cloquet produced the ground work for the connective tissue formation.

A case of Microphthalmia.—Mr. J. H. Fisher.

A male infant, aged 2 months. The left eye was normal except for the presence of a coloboma of the iris downward, associated with a similar defect in the choroid.

The right eye showed a shrunken upper lid, which was inverted on contraction of the orbicularis muscle. Both lids were well formed, and the lower one, which was not shrunken, was distended by a cyst, the size of a small hazel nut. Deeply situated in the orbit was an undeveloped eyeball, the size of a small pea. The child exhibited no other deformities.

? Metastatic Neuro-Retinitis.—Mr. J. H. Parsons.

Mrs. F. M., aged 41, came to University College Hospital, on December 23rd, 1907. Four days previously she had noticed the left eye was misty on waking in the morning, and this had continued ever since. Her brother had been under the care of Mr. Godlee with tubercular arthritis, otherwise there was no family history of importance. She had had one child, now aged nine, no miscarriages, and no syphilitic history was obtained. The urine was found to be normal. R.V. $\frac{6}{6}$, no H.M. L.V. Counting fingers at 1m. Ophthalmoscopic examination showed the left optic disc covered with a brilliant white exudate extending beyond the margin for a short distance, especially down and in. There was 3D of swelling, the veins were much dilated, and the arteries, which could not well be traced on the disc, were embedded in the exudation. There were a few hæmorrhages near the papilla, especially one, oval in shape, down and in. There was œdema of retina round the disc, extending as far as the macula. When last seen, on January 8th, 1908, in addition to the other signs, there was a perfect star-shaped figure, similar to that seen in albuminuric retinitis, at the macula. Vision the same as before. On January 13th the patient could count fingers at $2\frac{1}{2}$ meters, and the swelling of the disc had diminished; on February 11th the sight had improved to $\frac{3}{60}$.

The CHAIRMAN suggested that it would be interesting if Mr. Parsons would kindly inform the Society of the subsequent progress of this case.

Case of Follicular Conjunctivitis showing the result of special method of treatment: one eye treated, the other eye left untreated.—Mr. C. Wray.

The method Mr. Wray adopted was to forcibly crush out the follicles,

and subsequently paint the lids with 10 per cent. argyrol; 3 separate occasions being found sufficient to cause the disappearance of the follicles.

Retinitis Proliferans.—Mr. P. C. Bardsley.

H.H., aged 12, stated that the sight in the right eye had always been bad. There was no history of injury obtainable, and no difficulty was experienced at the birth of the child, and no instruments were used. At the upper part of the disc in the right eye is a large bundle of connective tissue stretching forwards into the vitreous on the temporal side, and the retina is detached; there are also a few strands to be seen on the nasal side.

THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

March 12th, 1908.

The President, Mr. MARCUS GUNN, in the chair.

An Orbital Case—for Diagnosis.—Mr. E. E. Henderson.

W.J.P., a female, aged 62, came for treatment complaining of swelling over the left eye, which had been red and painful for 4 months; 3 years previously a somewhat similar swelling had occurred in the same position. On examination a firm nodular mass could be felt, extending along the whole breadth of the orbit above the globe, apparently connected with the lachrymal gland. The diagnosis lay between new growth, chronic dacryo-adenitis, and chronic cellulitis.

An unusual form of Choroido-Retinitis.—Mr. J. F. Cunningham.

A patient, under the care of Mr. Lawford, was admitted to St. Thomas's Hospital complaining of defective sight which had commenced 7 months ago in the form of a luminous cloud when looking at a light. The vision in the left eye was the first to fail, and in both at the present time it was $\frac{1}{60}$. Mercurial inunction and iodide of potassium internally was the form of treatment applied, but no improvement was yet noticeable.

The ophthalmoscopic appearances, which were similar in the two eyes, presented a whitish area surrounding the disc and extending some distance to the nasal side, upwards and downwards, and to a less degree on the temporal side; in this there were some transparent areas through

which the choroid was visible. Vitreous opacities and some disseminated choroiditis could also be observed.

The fields of vision showed a large central scotoma in each eye, the loss extending also to the upper portion of field in the right.

A case of Retinitis.—Mr. G. H. Goldsmith.

This case was shown at the meeting of the Society held in January last. The condition of the right eye was unchanged, and there were still some deposits on Descemet's membrane. The patch below the left macula has diminished in size and is surrounded by a halo of radiating white streaks which was not present 6 weeks ago.

A Vascular Coil passing forwards into the Vitreous.—

Mr. M. L. Hepburn.

F.C., male and a negro, aged 20, came for treatment on account of some chronic conjunctivitis. On examining the left eye a vascular loop was seen to spring from the upper part of the disc and pass forwards into the vitreous for a short distance. Vision and other parts of the eye normal.

Punctiform remains of Pupillary Membrane in both Eyes.—

Mr. A. Hugh Thompson.

M.U., aged 26, a dressmaker, came complaining of defective sight. R.V. $\frac{6}{18}$ with correction improved to $\frac{6}{12}$, L.V. $\frac{6}{30}$ with correction improved to $\frac{6}{18}$. In the centre of each pupillary area and situated apparently on the anterior capsule of the lens, is a collection of small round brownish dots, and close by is a whitish opacity which is more deeply placed beneath the capsule. No history of past iritis, and nothing else abnormal discovered.

A case of (?) Albuminuric Retinitis in a child aged 7 years.—

Mr. Arnold Lawson.

This case was exhibited on December 13th, 1906, before the Society. The child had been under constant observation from that time, and a steady improvement had been maintained. The vision in both eyes had improved to $\frac{6}{9}$ with correction, and the ophthalmoscopic examination showed the disappearance of the macula stellate figures and the numerous white patches, leaving some superficial scarring and pigmentary mottling. The discs remain white, but the arteries are now of normal size or nearly so, and the previously shrunken fields have expanded to their full size. Albumen was only once found in the urine during 1907, although repeatedly searched for.

A case of (?)Parinaud's Conjunctivitis.—Mr. Arnold Lawson.

A young man, with a 12 months' history of discharge from the eyes and photophobia. There were large cockscomb excrescences of hypertrophied follicular tissue occupying almost the whole of the retrotarsal folds in both lids of each eye. There was enlargement of the pre-auricular and cervical glands, a culture revealed the *streptococcus pyogenes longus*, and these signs, in the absence of direct evidence of tubercle in the pathological examination of a portion of the growth, led to the diagnosis of Parinaud's conjunctivitis.

PAPERS.

A case of Microphthalmia.—Mr. H. H. B. Cunningham.

Girl, aged 13, no history of eye affection in the family except that one brother was myopic. The child was small for her age and showed some evidences of rickets, but there was no mental defect or deformity of any kind. The orbits were of equal size, but the left upper eyelid was smaller than the right and drooped slightly. Movements of the globes were full. The left cornea measured 2.5 mm. less than the right, the left lens was cataractous, and there was a posterior cortical opacity in the right. There were no colobomata. The patient was myopic, but the vision of the right was only finger counting at 1.5 metres, while in the left there was only perception of light.

Optic Neuritis in Cerebral Tumours.—Adjourned discussion.

After Mr. Paton had briefly referred to some slight re-arrangement of the statistical figures, Mr. PARSONS resumed the discussion. He considered that the statistics collected by Mr. Paton were very important, because of the accuracy of the observations, and pointed out that there was some discrepancy between his results and those of Edmunds and Lawford, while Uhthoff, on the other hand, supports the view expressed by these latter observers. Mr. Parsons did not think that the star-shaped figure at the macula was necessarily an evidence of the severity of the neuritis; and he was disposed to think that this appearance occurred more commonly in children than in adults.

Sir VICTOR HORSLEY dealt specially with the question of homolaterality of the swelling of the disc in relation to the tumour, and strongly opposed Mr. Paton's conclusions on this point. He said the age of the swelling must be studied, and not merely the maximum engorgement of the papilla; he also suggested that more attention should be paid to the part of the disc at which the neuritis originated. He referred to the

opening of the dura mater, where the mere relief of pressure produced subsidence of the optic neuritis, and he agreed with Mr. Paton that the cause of the swelling was not of vasomotor origin.

Sir WILLIAM GOWERS, who was unable to be present, sent a communication, in which he expressed himself in agreement with Sir Victor Horsley in regard to the homolaterality of the swelling and the tumour.

Dr. BEEVOR remarked that, from his own observations, he was led to the conclusion that the optic neuritis was most severe on the same side as the tumour.

Dr. FARQUHAR BUZZARD pointed out that Sir Victor Horsley's conclusions were not based upon any definite figures, whereas Mr. Paton's recorded a series of carefully observed cases, from which it appeared that the evidence forthcoming was not yet sufficient to make the homolaterality diagnostically important.

The PRESIDENT's experience inclined him to the view that in the majority of cases of tumour of the frontal lobes there was homolaterality of the neuritis, while in tumours arising further back there was not sufficient correspondence to make the sign of diagnostic value.

Lantern Demonstration of the Venous Connections of Schlemm's Canal.—

Mr. Thomson Henderson.

Mr. Henderson pointed out that the three channels of outflow for the aqueous were Schlemm's canal, the supra-choroidal space and the iris, the latter being an absorbing surface only by virtue of its crypts. The vascular supply of the ciliary body was derived from the arteriosus iridis major, and the blood was returned from this system through the vena vorticosæ except for a small area drained by the anterior ciliary veins.

By means of radial sections cut in series Mr. Henderson was enabled to show that there exist numerous anterior perforating scleral vessels, arranged at definite distances from each other, all of which communicate with Schlemm's canal; he also showed that this system was, through its branches, in connection with the circulus arteriosus iridis major, which therefore in reality constitutes a large venous sinus. The absorptive power of the iris thus became of importance especially in the treatment of chronic glaucoma, where the performance of iridectomy opened up, as it were, a large crypt through which the accumulated fluid could drain away into the venous sinus.

MALCOLM L. HEPBURN.

CEREBELLAR TUMOUR WITH PROPTOSIS.*

BY

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AND

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THE extreme rarity of proptosis occurring in cases of cerebellar tumour, or more properly in cases of tumour in the posterior fossa of the skull, is such that as far as we are aware there are only three cases recorded, namely those of Friedeberg, Van Hell and Booth. The following case came to Sir William Collins's Ophthalmic Department at the London Temperance Hospital on May 17th, 1906, and was seen by Mr. Hosford and diagnosed as a "Tumour of Cerebellum." The patient was admitted to the Medical Wards under Dr. Parkinson, where she remained for four months, but as the malady appeared to be very chronic she was removed to "The Home for the Dying, Friedenheim," where she died suddenly the next day.

L.V., aged 14 years, a tall, well-developed girl, had pains in the back of the neck in October, 1905, which lasted on and off, the mother said, for two or three weeks, and she then had her tonsils removed. She was not sick. There was no anæmia. Patient had never menstruated. In February, 1906, she had "rheumatic" pains in the limbs and back, with headache and sickness, and was attended by a doctor who kept her in bed for what the mother called "rheumatism."

During April the patient had two convulsions and the headache ceased, but she gradually began to "see things in a mist," and in the last week of the month she "saw

* Paper read before the Clinical Section of the Royal Society of Medicine, London, on March 13th, 1908.

things double," and her mother noticed that "her eyes began to grow out."

In the first weeks of May the pains disappeared, but the eyesight became very much worse, and she constantly complained of giddiness on sitting up. The mother brought the child to the Hospital on May 17th, "for spectacles," but she could not walk or even stand without leaning heavily on her mother's arm. The aspect of the face was expressionless, the head thrown back and the posterior neck muscles firmly contracted. There were no knee-jerks, nor was Kernig's, or Babinsky's sign, or ankle clonus to be obtained.

Sensation was normal, memory good, and hearing, smelling, taste and speech were natural. Patient was inclined to be emotional at times. The right arm was decidedly weak, both in the grip of the hand and the forearm muscles, and of this she complained.

The condition of the eyes was as follows: Great proptosis of each eye, equal on the two sides, so that much of the sclerotic was visible, and the eyelids correspondingly stretched. The lids and conjunctivæ were otherwise natural. There was no œdema, congestion, or chemosis, and the corneæ were natural. There was well-marked paresis of the right external rectus muscle and the centre of the cornea could never be brought to the mesial line. The left external rectus was weak but not nearly so markedly as the right. There was slight but definite horizontal nystagmus, which disappeared on admission but re-appeared the day before death. Altitudinal motions were normal. Von Graefe's and Stellwag's signs were absent, but Dalrymple's sign (widening of the palpebral fissure) was present. The pupils were equally dilated to 8 mm., and reacted very faintly and slowly to light. The tension was normal and the media were clear. There was in each eye, but more marked in the right, the most intense choked disc (neuro-retinitis Right=4 mm., Left=3 mm.)

accompanied by hæmorrhages, some of which were becoming decolourized. In the macula of the right eye there was a somewhat stellate whitish mass of exudation. Vision was reduced to counting fingers. Examination in the wards revealed nothing abnormal in neck, chest, or abdomen. The pulse was 98; bowels costive; temperature sub-normal; urine normal. There were no tremors. Treatment consisted in administration of mercury and iodides.

The patient continued in much the same condition until May 22nd, when in the early hours of the morning she had three fits of a general convulsion order, not severe and accompanied by slight loss of consciousness. These continued at intervals of a day or so. There was no headache or vomiting. In some of the fits there was tonic spasm of the right arm, forearm, and hand, and once or twice the fits started in the right arm. They rarely lasted more than a minute. The notes then ran as follows:—

June 7th. Still has fits daily and vomiting occasionally, of usual cerebral type, but no headache. Asks for glasses. Passed a round worm.

June 11th. No fits since the last note and no more vomiting.

Vision hand shadows. Swelling of nerve head is less and hæmorrhages are not so evident. Pupils still widely dilated. Weakness and wasting of right upper limb, grip on right side 10, that on left 21. Temperature subnormal.

June 29th. Proptosis and patient as before. No vomiting or headache. Is wasting. Well advanced secondary optic atrophy.

July 12th. Fits daily for last 5 days. No warning of them. Loses consciousness during fit and remains unconscious for about 10 minutes. Twitching begins, in some fits, at the right angle of the mouth, and is accompanied by enuresis. Patient cries on recovering consciousness. Does not know that she has had a fit. Is becoming more drowsy.

August 7th. Patient getting more and more apathetic and now passes urine and fæces under her. She complains of pains in right arm.

September 1st. Removed to Friedenheim. Horizontal nystagmus again present. Died September 2nd, quite suddenly, with asphyxial symptoms. Temperature rose to 101.2° before removal from wards of L.T.H. on September 1st.

Post mortem 3rd September. Much emaciation. Proptosis not quite so marked as before death, but still very pronounced, although the eyeballs could be pressed back into place. Convergence of each eye. No sign of separation of the cerebral sutures, or alteration in bony orbit.

On opening cranium the meninges were natural, but there was an escape of a great quantity of intra-ventricular clear fluid. The ventricles were much dilated, and the cerebral cortex flattened and thinned and tunics of nerve sheath distended. The orbit was natural. Attached to the pia mater on the under surface of the right lobe of the cerebellum was an irregular, flattened, well circumscribed, encapsulated, very firm, pink growth, about the size of a large pigeon's egg, and containing old blood clot in the centre. It pressed upon the restiform body and medulla oblongata on the right side, dipping down so much into the foramen magnum that a piece of the tumour was left behind by the pathologist during the process of removing the brain.

The whole growth appeared to have been wedged between the bony wall and the right side of the medulla.

Microscopical examination showed the growth to be a fibro-psammoma. There was a small P.M. clot in the right lateral sinus far back. The other organs in the body were natural.

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REVIEWS.

F. DIMMER (Graz). **The Light Reflexes on the Retinal Vessels.**
Klinische Monatsblätter für Augenheilkunde, April, 1907.

DIMMER holds the same views as to the light streak on the retinal vessels that he advocated in 1891 (*vide O. R.*, 1892). These views are that the streak on the veins is a reflexion from the anterior surface of the blood column, while that on the arteries is due to the "axial stream."

He has repeated his former experiments and observations over and over again without seeing anything to induce him to alter his former opinions, and he adds in the present communication the following considerations:—

It is impossible for anyone who has once seen the reflex in the frog's eye, or in the frog's mesentery, to hold any other opinion than that what is seen is an axial stream; the brief doubling of the reflex in a large vein where two smaller vessels open into it can have no other explanation. But it is objected that the same appearance is seen in a frog's mesentery by transmitted light, and this cannot be due to the axial stream. Becker observed this light reflex years ago, and held that it was capable of explanation by Loring's theory. Dimmer, however, holds that on careful examination this reflex also will be seen to be the axial stream. The same rapid current is visible as in reflected light, the same doubling or even trebling at the union of two or three veins, and the same vanishing of the streak when the blood current falls into disorder as the current comes to a standstill.

Against Loring's theory, which is that the reflex on the retinal arteries is due to refraction of the light from the subjacent fundus by the cylindrical blood column, Dimmer argues that entopic examination shows it to be false, for the vessels are merely dark shadows as so observed. Also Dimmer finds that no such phenomenon is seen when either frogs' or men's blood is observed in capillary tubes immersed in cedar oil. The centre of the blood column is, on the contrary, darker than the edges, just as one would *a priori* expect it to be.

Again the microscope shows that the axial stream is a central portion of the current where the corpuscles are closely packed

in an almost optically homogeneous mass, while around this axial stream there is a hollow cylinder of less densely packed corpuscles, where they can be seen rolling over each other. With both transmitted and reflected light the central stream can be seen through the thin outer cylinder, and with reflected light the outer region of the vessel shows the well-known dark lines owing to the larger amount of the outer cylinder there present to absorb light. A similar explanation holds for the appearance of the axial stream in transmitted light.

The absence of a definite smooth surface to this axial stream prevents its reflecting light itself as a thin streak, such as is seen in the retinal veins.

In the dog's retina the light streak is the same breadth in veins and arteries, and Dimmer attributes the reflex in both to the axial stream. That the streak in the dog's veins differs in its size and causation from that in the human veins is due to the lighter colour of the dog's blood.

It may be objected that the axial stream has never been directly observed in warm-blooded animals. Dimmer has accordingly made microscopic examinations of mesenteric vessels of guinea-pigs, and seen an axial stream in them as distinctly as in the frog, but with greater technical difficulty.

Observations on other animals, frogs, dogs, etc., would lead us to expect that the light streak seen in human retinal vessels is the effect of the axial stream. It is certainly so as regards the arteries, but the streak on the veins differs therefrom so completely in its narrowness, its purely white colour, and its want of continuity that it cannot have the same origin. These differences cannot be overlooked by any unprejudiced observer, and are only explicable by the assumption that the venous light streak is a reflex from the blood column. This view is supported by observations on normal human eyes subjected to pressure during ophthalmoscopic examination. All eyes are not fit for such observations, very old eyes for various reasons, and young eyes often on account of the disturbing retinal reflexes (shot silk) which more or less mask the venous light reflex. Observations can be made with normal or with dilated pupil, but in the latter case the light reflex on the veins will be broader, as has been formerly pointed out by Dimmer.

Omitting details, the following points can be noted after pressure has been applied. If an artery and a vein have each been made completely bloodless on the disc there will still be

seen a perfectly unaltered light reflex on a portion of the venous trunk some distance away from the disc: but the corresponding portion of the artery behaves differently. The light streak here becomes narrower, and corresponds in breadth to the normal light streak on a retinal vein: the colour too changes, becomes whiter, and the reflex is interrupted as it is normally in the veins.

When the pressure is suddenly relaxed the arterial light streaks resume their normal breadth, and also their reddish colour. These observations prove that when the circulation is arrested the axial stream can no longer be seen, and the light streak on the arteries is then merely, as in the veins, a reflex from the blood column.

Dimmer has occasionally observed that the arterial light streak is displaced from the centre towards the side of the vessel when pulsation is produced by pressure. This phenomenon, he affirms, can only be accounted for if the streak is due to the axial stream. No reflex from the vessel wall or from the blood column could behave in such a manner.

The most striking of all these observations is that often a doubling of the arterial light streak may be seen during pulsation. This doubling occurs in the trunk of the artery immediately before bifurcation, and is obviously due to the regurgitant axial streams from the two branches not promptly fusing when the blood flows back into the collapsed trunk of the artery.

Some additional light is thrown on the subject by observations on pathological eyes, viz., leucæmic eyes. Grunert has described a visible blood stream in a leucæmic eye which suffered from "choked disc." The movement of the blood stream was visible in the larger veins, and the explanation given by Grunert is that the slow current and the enormous amount of large and slowly moving leucocytes made the observation possible.

Dimmer has seen in leucæmia light streaks on veins as large as those on the arteries, viz., about one-third the diameter of the blood column. On pressure the venous blood column contracted, and a white streak appeared at each side. These white streaks coalesced on further pressure, leaving then one broad white streak, which was narrower than the blood column before application of pressure. In the more peripheral portions of the vein the light streak was broken up into white

specks which moved centripetally towards the disc, just what is seen in the frog's eye in retardation of the circulation. Dimmer believes that these cases prove that in leucæmia we may, owing to the pallor of the blood, occasionally observe the axial stream in veins as well as in arteries. In another leucæmic eye Dimmer was able to observe a distinct doubling of the light streak in the trunk of a vein during application of pressure.

Whether Dimmer's conclusions are to be accepted unreservedly or not the following are, in the reviewer's opinion, beyond question:—The arterial light streak is larger than the venous. It is red in colour, while that on the veins is white. The arterial streak is continuous, the venous interrupted. Normal human blood cannot be described as otherwise than opaque, even in the arteries. Its opacity is manifest in the purely dark shadows seen in entopic examination. Therefore the blood-vessels containing normal blood cannot act as cylindrical lenses as stated by Loring. If they did the image formed would be red. In the veins the light streak is white, therefore it is not due to refraction. Of course, refraction might cause the red arterial streak, but if so it should be absent on arteries passing over pigment masses, and be brighter on arteries passing over white backgrounds, and this most observers deny.

It must be admitted that some reflex may come from the vascular walls both of veins and arteries, for the larger vessels at any rate have walls which can be seen with the ophthalmoscope, and some reflex should be obtained in eyes with "perivasculitis." But having admitted so much we must attribute to the blood column the chief part of the venous light streak. As regards the arteries, it will be necessary to adopt Dimmer's axial stream theory if further observations establish the accuracy of the statement that under certain conditions a distinct duplication of the light streak can be obtained.

L. W.

BEST. Subconjunctival Injections: their Effect on Retinal Metabolism. *Archiv für Augenheilkunde*, May, 1907, Vol. lvii.

PREVIOUS investigators have proved that the composition of the aqueous, and to a much slighter extent of the vitreous, is altered by the injection of salt solution under the conjunctiva,

but their investigations tend to prove that this effect is not due to the passage of the fluid injected into the interior of the eye, but to the irritant action of its presence in the subconjunctival space. The composition of the aqueous is found to be more albuminous and the amounts of agglutinins and precipitins, of which small traces are normally present in the aqueous, are also increased. These are the results of Wessely's experiments, and Wessely further showed that change in the composition of the aqueous is due to an enlargement of the lumen of the vessels from which the aqueous is secreted. Not only subconjunctival injections, but other irritants whether of a mechanical, chemical or electrical nature, have a similar effect. With regard to their effect on the metabolism of the cells, Wessely's experiments proved nothing.

Best has carried the investigation of this subject a step further. After subconjunctivally injecting the eyes of rabbits, some with a 4 per cent, others with a 10 per cent. solution of salt, he has killed them in 24 hours. Microscopical sections of the eyes so treated show a remarkable difference from those not so treated, when stained with carmine. The eye of the normal rabbit is practically free from glycogen. After the injection most of the ocular tissues remain practically free from glycogen still, but the retina appears to be loaded with it. Its distribution has nothing to do with the particular place when the subconjunctival space was injected, but there is rather more of it towards the periphery than in the central area, and the different layers of the retina are very differently affected. Glycogen is especially abundant in the nerve fibre and ganglion layers and the inner molecular layers, and is also present in the space between the hexagonal pigment cells and the rods and cones, but the other layers are practically free from it. It is noteworthy that the vessels both of retina and choroid show no trace of the presence of glycogen, which shows that the final stage in its formation must be due to a specific activity in some of the cells of the retina itself. Best suggests that these may be the glia cells. The question as to what gives rise to this specific activity is left undetermined, but the nature of the substance injected has apparently nothing to do with it, for similar results follow the injection of very different solutions, and even from the cauterisation of the conjunctiva. The experiments therefore go to establish that a definite effect on the metabolism of the retinal cells is produced by irritants

applied in their neighbourhood, of which irritants the sub-conjunctival injection of salt solution is a typical example. Whether the effect of such changed metabolism is useful as a therapeutic measure is beyond the scope of the investigation, but if it is found to be so clinically, the road towards a rational explanation of the fact would seem to be indicated.

The paper is illustrated by two drawings of retinal sections, one from the normal eye of a rabbit, and the other from the second eye of the same animal which had been subconjunctivally injected with a 10 per cent. salt solution. The latter shows the outer layers, and the space between the hexagonal pigment layer and the rods and cones stained pink with carmine to a considerable extent, an appearance wholly lacking in the former.

A. H. T.

KELLY. A Critical Study of the Organic Preparations of Silver in Conjunctivitis. *British Medical Journal*, November 23, 1907.

It is only within a comparatively recent date that the study of the organic preparations of silver, and their relative efficiency as compared with nitrate of silver, has been approached in anything like a methodical and scientific manner by means of laboratory experiments coupled with careful clinical observation. It is urged by some that laboratory methods only afford at the best an imperfect indication of what occurs in nature. This may be so in our present state of knowledge; but as we become better acquainted with nature's processes we can more readily imitate them in the laboratory. Results arrived at by this method of research have, as the author truly points out, at least a comparative value, and are to be preferred to those arrived at by a more or less loose empiricism, judging by the mass of conflicting evidence which exists to-day on this subject alone.

The author has sought to ascertain the relative bactericidal powers of argyrol, protargol, and silver nitrate. The organism chosen as a test was the staphylococcus pyogenes aureus, as it gave the most constant results. The drugs were bought from a wholesale chemist and the percentage of silver was determined gravimetrically in the usual way. Argyrol gave 17.03 per cent. (it is supposed to contain 30 per cent.),

protargol 7.03 per cent., and silver nitrate 66.6 per cent. Every precaution was taken to prevent decomposition, and the substances were always used before the third day. An emulsion of a three days' growth of the staphylococcus on agar was filtered and diluted to 10 volumes. The solution was brought into contact with the organisms, and at intervals of 5, 10 and 20 minutes two loopfuls were taken and smeared over the surface of agar slants. These were incubated at 37.5° and examined every 24 hours for ten days. Control experiments were made with an equal volume of distilled water, and in these a growth was always obtained on the first day. The results briefly are as follows:—

Bactericidal power of Silver Nitrate (50 experiments):

0.0039% solution killed the organisms in 5 minutes.

0.0019% solution killed the organisms in 10 minutes.

0.0009% solution did not kill the organisms even after 20 min.

Protargol (49 experiments):

1% solution killed the organisms in 5 minutes.

0.5% solution killed the organisms in 10 minutes.

0.25% solution did not kill the organisms even after 20 min.

Argyrol: With a 50% solution acting for 12 hours a growth was always obtained on the first day. No growth after 24 hours' exposure to the argyrol solution.

These results are extremely interesting if we analyse them. In the first place, we notice that silver nitrate contains roughly nine times as much silver as protargol and four times as much as argyrol, and the solution of protargol had to be roughly 256 times as strong as the silver nitrate solution in order to produce the same effect. Clearly therefore the amount of silver contained in any silver salt is no criterion of its bactericidal power. This has previously been pointed out by Drs. Marshall and Neave. The question then arises, to what are the bactericidal properties of silver nitrate and protargol due? The explanation, we think, is to be found in the property which silver nitrate and other metallic salts possess of becoming electrically dissociated. It is especially marked in the case of nitrate of silver and other inorganic salts of that metal, capable of reacting with sodium chloride. It has been shown by Franca (*Zeitschr. Physio. Chem.*, 1906, 48, 481-88) that the presence of proteid diminishes the electric dissociation of different metallic salts—sulphate of copper, nitrate of mercury and nitrate of silver—so that the number of metal ions in

solution becomes extremely small, and also that a strict parallelism exists between the toxicity (and presumably the bactericidal power) and the number of metal ions in solution. So that it would appear that the metals are only poisonous when in an ionised condition.

Coming now to argyrol, in which no free silver ions exist, if the above theory be correct we should expect it to possess little or no bactericidal power. This is precisely what is borne out by experiment in the laboratory, for we find, from the author's experiments, that a 50 per cent. solution only kills the organisms after 24 hours, and it is a moot point even then whether the organisms are killed directly by the argyrol. Now, how is this applicable in the case of protargol? It also is an organic compound of silver—how and why do the two differ? Here again our theory comes in to help us. Protargol, as we have pointed out elsewhere, contains ionised silver and is capable of giving a reaction with sodium chloride—in spite of numerous statements to the contrary; and to this fact must be attributed in a large measure the bactericidal power and diffusibility of protargol as well as the pain it gives rise to when instilled into the conjunctival sac. The interesting point is that the nitrate equivalent of a 1 per cent. solution of protargol is not very far removed from a 0.0037 per cent. solution of silver nitrate. In other words, the two are almost identical, and, as we see from the author's figures, they have roughly the same bactericidal power.

Action on Intra-Cellular Organisms. As most of the organisms producing conjunctivitis are intra-cellular, an attempt was made to ascertain the combined bactericidal and penetrating power of the drugs by allowing them to diffuse into an agar tube containing a three days' culture of the staphylococcus. It was found that a 0.75 per cent. solution of silver nitrate killed the organisms in 10 minutes. With protargol the solution had to be 30 per cent. in order to effect the same. The author reasons therefore, as regards combined bactericidal and penetrating power, silver nitrate is forty times as strong as protargol. He then proceeds to show that when the solutions are brought into direct contact with the organisms a 0.0019 per cent. solution of silver nitrate, or 0.5 per cent. of protargol, kills the organisms in 10 minutes; that is, as regards bactericidal power alone, silver nitrate is 263 times as strong as protargol. He then adds as a

deduction from the above figures, that protargol would appear to have greater powers of diffusion than silver nitrate. This deduction is certainly one which is not borne out by experiment, for if we determine the rate of diffusion of protargol through an animal membrane and compare it with that of silver nitrate we shall find that the latter is the more diffusible of the two. The discrepancy must be accounted for in some other way. Of course we all realise how difficult it is to imitate nature in this particular action, and we may add that the problem of the penetration of the different silver salts into gelatine or agar tubes is *per se* anything but a simple one; there are many disturbing factors to be taken into account of which we may merely mention here that the rate of penetration is intimately influenced by the amount of soluble chloride existing in the gelatine or agar and the depth of penetration by the strength of the silver solution; and unless these are allowed for we cannot hope to arrive at correct results.

Staining of the Tissues. The organic compounds of silver are stated not to give rise to staining, and this we believe to be a statement which can be substantiated as regards argyrol. The case of argyrosis alluded to by the author—in which a 20 per cent. solution of argyrol was injected into the sac in dacryocystitis after a false passage had been made by a probe—can hardly be said to be a typical case, being more of the nature of an extravasation.

Pain accompanying use. The author has tried a 0.5 per cent. solution of silver nitrate and 20 per cent. solution of protargol in his own eye, and finds the discomfort caused by the silver nitrate lasted 25 minutes and that due to the protargol 35 minutes. Argyrol in 20 per cent. solution is quite bland and even soothing to an inflamed eye. We think that the amount of silver capable of giving a precipitate with sodium chloride existing in a 20 per cent. solution of protargol is quite sufficient to account for the pain that the author experienced. Protargol cannot be called a genuine organic compound of silver. We notice one observer states that protargol contains glycerine; if so, this may be another factor in producing pain.

Lotions. The author believes, and we agree with him, that the beneficial effect of the different lotions in common use, such as alun, boric acid, zinc sulphate, carbolic acid, permanganate, chinolol, sublimate, tannic acid, is not so much due to the drug as to the vehicle in which it is contained.

and is produced by the mechanical removal of the organisms and inflammatory products rather than by any bactericidal action. It was found that:—

Carbolic 1 in 20 killed the staphylococcus in 20 minutes, but not 1 in 40.

Corrosive 1 in 500 killed the staphylococcus in 20 minutes, but not 1 in 1000.

Saturated solutions of alum and zinc did not kill the organisms in 20 minutes.

Chinosol 1 in 5 did not kill the organisms in 20 minutes.

Potassium permanganate 1 in 400 killed the organisms in 20 minutes, but not 1 in 800.

It is interesting in this table to notice the extreme toxicity of the metals. Copper is extremely toxic; even so dilute a solution as 0·00005 gram. of copper sulphate in 1 litre of water will render penicillium inactive. We have used this for collyria.

Experience in treatment of the different varieties of Conjunctivitis. In conjunctivitis due to Koch-Weeks' bacillus the conclusions arrived at by the author are that the duration of the disease is not shortened by the usual modes of treatment, that protargol on account of its irritating properties often does more harm than good, that argyrol being bland and mildly astringent is beneficial and lessens the discomfort, but that all essentials of treatment are fulfilled by washing out the conjunctival sac frequently with normal saline solution. As regards Morax-Axenfeld conjunctivitis, the conclusions are that protargol and argyrol are not beneficial, but that zinc sulphate quickly cures the disease, the best results being got with a solution of gr. viii. to 3i. Nizin (sulphanilide of zinc) was not so effective. In five cases after treatment with a solution of gr. vi. to 3i. the bacilli could still be seen at the end of one month.

Gonorrhoeal ophthalmia in infants would, the author thinks, be best treated by irrigating the conjunctival sac every two or three hours with two pints of normal saline at a pressure of one foot; with a greater hydrostatic pressure (2 ft.) the cases did not do so well. Argyrol in 20 per cent. solution had no influence on the course of the disease.

In staphylococcic and streptococcic conjunctivitis, four cases treated by simple irrigation of one eye and instillation of 20 per cent. argyrol in the other, the irrigated eye improved

more rapidly, but the argyrol lessened the discomfort and blepharospasm.

The paper is interesting and praiseworthy on account of the careful work manifest in it. We would suggest that the author should follow up his diffusion experiments with a view to reconciling the discrepancy between his figures in this difficult part of the subject.

J. BURDON-COOPER.

V. MORAX. Sarcoma of the Orbit and Middle Cranial Fossa. Hemianopia with Hemiotic Pupils from Compression of the Optic Tract. *Annales d'Oculistique*, October, 1907.

THE clinical facts of this interesting case were as follows:—The patient, a man aged 40, had enjoyed good health till early in 1904, when he began to suffer with attacks of severe headache radiating from the right temporal region, and not associated with vomiting. He also occasionally complained of noticing a disagreeable smell in his nose. He sought no advice for a year, and was then treated by intra-muscular injections of calomel, etc., without benefit. When he consulted Morax, in August, 1905, he complained of slight weakness in the legs, and some loss of memory.

Physical examination revealed moderate and irreducible proptosis of the right eye with defective movement upwards and outwards. There was a well-defined bulging of the right temporal region. Nothing could be felt by the finger in the orbit. Pupils, fundi, vision, and fields were normal on both sides. It was thought that the case was one of periostitis of the orbit and temple, and injections of calomel were again advised.

In January, 1906, slight swelling of the right disc was noted for the first time. Sight, fields and pupils remained normal. Shortly after this the patient began to experience irresistible impulses to run. He would run straight ahead for some minutes, and then fall, but was able to rise and return home. His memory failed more, and he had to give up work. In March, 1906, he was admitted into hospital. Gait was hesitating, and he had attacks of vertigo. Knee-jerks exaggerated, plantar reflex normal, no alterations in cutaneous sensation. The perimeter now for the first time revealed typical left homonymous hemianopia, and there was a definite (relative) hemiotic pupil reaction. Sight was still normal, and the appearance of the right disc had not altered. Lumbar

puncture was performed, but the centrifugalised fluid showed no abnormality. A few days later the patient became comatose and died.

Pathological examination. The whole of the right temporo-sphenoidal lobe was occupied by an encapsulated tumour. The tumour compressed the optic nerve and tract, the latter being bent into an S-shape. In the upper and outer part of the right orbit was a growth the size of a small walnut directly continuous with the cerebral growth through the sphenoidal fissure. Microscopically the tumour was found to be a vascular sarcoma.

Commenting on the case, Morax, after noting that Silex and Heddaeus doubt the possibility of a hemiopic pupil reaction ever existing, states that this is the only case in which he has observed it. He expected to find marked changes in the affected optic tract, but a careful microscopic examination of both tracts (hardened in formol-Müller, embedded in celloidin, and stained by the Weigert-Pal method), showed no degenerative changes in the compressed tract. He points out that only twelve days elapsed between the first discovery of hemianopia and death. None the less interesting is the fact that such grave symptoms as hemianopia and hemiopic pupil reaction can occur without lesion in the optic fibres discoverable by our existing histological methods. As a careful examination of the other parts of the brain, lesions in which might cause the hemiopic symptoms, proved quite negative, these symptoms may justifiably be referred to the simple compression of the right optic tract.

Referring to the bulging of the temporal region which was mainly responsible for the wrong diagnosis, Morax says that it is a symptom the significance of which is little known, except as a sign of inflammatory œdema accompanying lesions of the orbital walls. In this case it was found *post-mortem* to be quite independent of the orbital growth, and due to a definite deformity of the skull itself caused by pressure of the intracranial growth.

Morax appears to have attached no significance to the subjective sensation of smell experienced by his patient. This symptom has, however, been met with in several cases of tumour and abscess in the anterior part of the temporo-sphenoidal lobe (Ferrier's centre for smell), and is a valuable localising symptom of lesions in this region.

WALTER SINCLAIR.

W. CZERMAK. **The Operations of Ophthalmology.** Second Edition, Edited by Prof. A. Elschmig (Prague). Vol. i., Parts 1 and 2, 1907. Berlin and Vienna: Urban and Schwarzenberg.

A NEW and considerably enlarged edition of this famous work is now in course of production, of which Volume I. (in two parts) has now appeared, under the Editorship of Prof. Elschmig. The ground covered by the first volume may thus be indicated:—First comes a description of the instruments in general use, under various headings; then a discussion of the subject of asepticity; and a third section dealing with operations generally and with the after-treatment. Next, classifying the operations, the author proceeds to describe those performed upon the eyelids, for ectropion, trichiasis, etc., plastic operations, operations for ptosis, for trachoma, for symblepharon. Then follow operations on the tear passages and on the ocular muscles and the orbit.—enucleation, evisceration, etc. Each subject is most carefully dealt with, the operation described at length, the circumstances demanding it enumerated, the advantages and disadvantages connected with it explained, the accidents likely to happen in the course of it discussed; all is done in a most thorough manner, as is indicated by the fact that about 570 pages are occupied in the process. The practising surgeon—to whom alone the book is likely to prove useful—will find in these pages many points of value to him in his work. One might have desired to have a larger number of illustrative diagrams, and one misses any mention of a number of useful procedures with which one is familiar, but which have not the advantage of having had a Teutonic origin. At the same time, it is fair to say that one would not desire to have every modification described which the zeal of operating surgeons has devised, and that a considerable number of non-German procedures are carefully explained.

N. B. HARMAN (London). **Preventable Blindness.** London: Baillière, Tindall and Cox, 1907.

MR. HARMAN limits the subject of his little book practically to ophthalmia neonatorum, a disease the results of which he certainly has had abundant opportunity to study, being, as

he is, in medical charge of the schools for the blind established by the London School Board, and now maintained by the County Council. He makes out,—and his figures agree pretty well with those of observers in other countries and at other times,—that 36 per cent. of all children blind from birth are so on account of purulent ophthalmia, and if a similar proportion holds good throughout the country (England and Wales) then something between 1,000 and 2,000 persons are living blind whose blindness could almost infallibly have been prevented. It is indeed horrible that there should be so much perfectly needless distress; and one has to consider further the pecuniary loss involved, directly and indirectly, thereby. Most of the substance of the book is, as he says, familiar matter to the ophthalmic surgeon: to this we need not refer further: but his chief thesis is the question of prophylaxis. With this he deals first historically, showing the marvellous results first obtained by Credé, and discussing the proposition put forward not long ago that his method should be made compulsory. His figures show how little need there is for this, as cases (at all events cases with bad results) appear to occur in only something like 0·0226 per cent. of all children in the elementary schools of London. There are other objections, of course, to such extraordinary legislation. Harman deals, further, with proposed Compulsory Notification, which he recommends as probably capable of becoming a means of “stamping out” the disease. Notification is obviously no use without further action, and he recommends that the Infectious Diseases Notification Act (1889) be called into play, just as was done in the case of cerebro-spinal meningitis, and under it the local authority could call in the aid of experts, as was also done recently in certain epidemics. The Medical Officer of Health could not treat the cases himself, but he could demand a medical certificate that they were being treated: failing such assurance he could cause the removal of the patient to a hospital of the Metropolitan Asylums Board. This is how he would reform matters in London. We have not entered into all the details of his scheme, which is certainly worthy of consideration.

In conclusion, he draws attention to a fact to which the reviewer has repeatedly had occasion to refer also, that the trend of recent regulations is to make this world a harder place for those maimed or imperfect or inefficient in any way; and

it is therefore good economy to prevent so far as possible the occurrence of any malady likely to diminish the efficiency even of one eye.

Mr. Harman's little book deserves careful perusal: he gives one or two therapeutic hints of considerable value.

KOSTER (Leyden). **The Permanent Drainage of the Tear Passages.**

PROFESSOR KOSTER, after commenting on the desirability of obtaining some method of restoring the patency of the tear duct, and on the inadequacy of treatment by probing, briefly describes the instruments which he uses in his method of establishing permanent drainage. The object aimed at is to introduce a double strand of silk thread into the duct to act as a permanent drain, the lower ends of the threads being drawn out through the nose and tied to the free upper ends lying on the cheek. A hollow metal sound, shaped like a Bowman's probe, is first passed down the duct into the nose. A double thread of silk is then passed through the sound on a carrier, and by means of a small blunt hook this thread is caught and pulled out of the nose. The sound and carrier having been withdrawn, the thread is left *in situ* to act as a drain. To identify the lower end of the sound in the nose and catch hold of anything introduced through it from above proved often a most difficult task, and Prof. Koster was fortunate in having the co-operation of a rhinologist—Prof. Kan—in carrying out the treatment on many of the cases cited. A device used in a good many cases was to introduce a double strand of very fine copper wire down the lumen of the sound. The loop of wire projecting from the end of the sound was then caught and pulled out of the nose with the hook. Strands of silk of the requisite thickness were readily drawn into position by attaching them to the upper end of the wire.

The results of the treatment were, on the whole, very successful. The length of time during which the threads were allowed to remain in position varied in different cases, but about a month appears to have been an average time. While the thread is worn in position the eye should be kept clean with a simple lotion of 3 per cent. potassium chlorate. Improvement in symptoms usually begins immediately after the successful

introduction of the drain: Astringents, *e.g.*, silver nitrate, may be applied to portions of the thread and the medicated portion drawn into the duct.

Professor Koster thinks the treatment is suitable for many forms of affections of the tear passages, *e.g.*, (1) chronic blephorrhoea of the sac not yielding to ordinary treatment; (2) dacryocystitis with fistula; (3) stenosis of the duct not yielding to dilatation with probes; (4) cases complicated by necrosis of bone in the neighbourhood of the duct.

At the end of his paper Professor Koster makes some interesting statements regarding false passages made in probing the duct, and also discusses the feasibility of draining the tear duct by opening into it from the nose above the level of the inferior turbinated bone.

The paper is a very suggestive one. The chief objections to the method of treatment advocated appear to be (1) the technical difficulties to be overcome in introducing the drain; (2) the disfigurement caused by the loop of thread visible on the face.

J. V. PATERSON.

L. NATANSON (Moscow). **Microphthalmos with Cyst Formation in the Lid.** *von Graefe's Archiv für Ophthalmologie*, lxvii., 2.

IN this paper Natanson gives an account of the microscopical anatomy of the orbital contents of two children, in which this anomaly was present on both sides.

In the first case the development of the eye was very rudimentary, only the pigment membrane part of the primitive ectodermal layer being present. The lens was partly formed in the tissue of the uninvaginated distal layer. Two cysts were present, in the smaller of which the optic nerve ended. The retina was present in the cysts with the outer layers facing the cavity, "retina perversa." The intra-cranial parts of the optic nerve, chiasma, tracts and lateral geniculate bodies were atrophic.

In the second case the eyes were much more developed. The lens lay in the vitreous, but was only partly formed. Two cysts were present, the smaller of which was solid, and in this the optic nerve ended. In both cysts "retina perversa" was present. A large cleft, in the position of the primitive cleft, was present in the eye, and communicated with both cysts. In

the neighbourhood of the cleft there was on the left side some inflammatory change.

The author has collected 74 more recorded cases, and is of the opinion that all the cases fall into two groups.

Group 1 includes those cases in which a microphthalmic eye is present, fairly well developed, with a cleft through which the retina passes to line the cyst or cysts. There is never any communication between the cavity of the vitreous and that of the cyst. The optic nerve is feebly developed, and may terminate in the bulb above the cyst neck or in the cyst neck itself.

Group 2 includes those cases in which the eye is either absent or in a very rudimentary state of development. If present it contains neither lens, vitreous nor retina, and remains in communication with the back part of the cyst.

In regard to the pathogenesis of group 2, the author agrees with Mitvalsky in believing the cause to lie in arrested development of the primary optic vesicle. The distal layer undergoes no invagination, but proceeds to differentiate, thus forming the perverse arrangement of the retina. The proximal layer develops into pigment epithelium, and is surrounded by the more or less developed mesodermal structures.

While admitting that Mitvalsky's hypothesis of a partial invagination may explain some of the cases in group 1, Natanson believes that these cases originate in the stage of the secondary optic vesicle, and are connected with the incomplete closure of the foetal optic cleft. That they have any connection with the ectasis of a coloboma is negatived by the perverse arrangement of the retina, and by the fact that the cyst communicates not with the vitreous cavity but with the space between the pigment membrane and retina.

The drawings and diagrams which accompany this paper render the author's account of the formation of these cysts quite clear.

E. E. HENDERSON.

G. LENZ (Breslau). **A Form of Degeneration of the Epithelium of the Cornea not hitherto described.** *Klinische Monatsblätter für Augenheilkunde*, October-November, 1907.

THIS paper consists of the history of a case in which a peculiar form of superficial opacity developed in the cornea, with a

description of the clinical appearances and of the results of anatomical examination of portions excised from the affected part.

The patient had a wound of the cornea from a foreign body some 12 months before he noticed his visual defect. In the transverse zone of the cornea exposed by the lids there were three intensely white and quite superficial opacities, the surface of which was at parts smooth and at parts dull and granular. Around and between the patches there was a cloudiness of the cornea, which reached at one point to the limbus, where superficial vessels entered it. Only one eye was affected, and the upper and lower parts of the affected cornea were normal. The white patches were repeatedly removed, on one occasion freely with Bowman's membrane and some of the corneal lamellæ; but the condition recurred in a very short time. No increase in their size was noticed.

The pathological changes were confined to the epithelium, and consisted in swelling and separation of the cells with degenerative changes in the nucleus. Towards the surface the cells elongated into bands, granules showed in the protoplasm, the cells became homogeneous, refractile and stained intensely with eosine; a dense membrane was thus formed.

The relationship of this process to "band-shaped opacity" of the cornea is discussed, and the conclusion arrived at is that such a condition is essentially different from the case investigated. The pathological process is one of degeneration of a hyaline form,—the material formed being a colloid.

The other forms of superficial degeneration are compared with this case, and the points of difference between it and degenerations in old leucomata and in filamentary keratitis are indicated.

The position is clearly established that the condition is essentially different from any previously described; its etiology is not established, and no treatment had any beneficial effect.

ALFRED MACNAB.

L. STEINER (Java). *The Normal Eyes of the Javanese.*

Zeitschrift für Morphologie und Anthropologie, x. 3.

THE author, who practises as an ophthalmic surgeon in Java, has written an all-too-brief and interesting paper upon the peculiarities of the eye of the Javanese, illustrated by a few beautiful coloured sketches. The first thing which strikes one,

he says, is the apparent small size: this means merely (we gather) that the palpebral aperture is narrow and exposes a comparatively small portion of the surfaces as contrasted with the European; but then the Javanese is usually a smaller person altogether. On the ocular conjunctiva irregular brownish spots are frequent, as they are on other mucous membranes, *e.g.*, those of the palate, gums, and vagina: these usually are more marked in those of advanced years: in older persons the whole visible sclera (which itself has a brownish tinge) may be spotted over with these masses, especially at the limbus. Frequently, too, there are large, dark, almost black, splashes of pigment on the posterior surface of the upper lid. The iris is very dark-brown, hardly distinguishable from the black pupil. He tells us that the fundus differs very materially from that of the European, but unfortunately he gives no illustration of this. What an interesting and instructive collection might be made of sketches of the eye and the fundus in different races!

W. G. S.

E. LUCAS HUGHES (Liverpool). **Squint and Ocular Paralysis.**
London: H. K. Lewis, 1907.

WE have to congratulate Mr. Hughes on the production of a clear and well-written book on the subject of Squint and Paralysis of the Ocular Muscles. There is not much in it which is new, but the author frankly admits this in his preface, and states that his aim has rather been "to state clearly and to emphasize important points" the knowledge of which we owe to others, and in this endeavour he has succeeded very well indeed.

In regard to the etiology and treatment of concomitant squint he appears to be a devout disciple of Worth, whose admirable work is quoted with approval on numerous occasions. He is very dissatisfied with the attitude towards convergent strabismus adopted by many surgeons, and even with the definitions of the condition promulgated by various authors, which he thinks refer too exclusively to the chief symptom (deviation) and neglect the true disease, and he propounds the following as more suitable: "A lack of development of the faculty of fusion which interferes with the organic arrangement of binocular vision, and causes a deviation of the visual axis of one of the eyes from the correct position of fixation." But

surely in avoiding Scylla he has fallen into Charybdis, for in the minds of most people squint is not "lack of development, etc.," but the faulty attitude or position which has arisen, whether his theory of its origin be right or wrong. There are certainly cases which the fusion theory does not fit, at least not in an unmodified form, though all will admit that when a patient once agrees with himself that he is going to squint he gives up the attempt to secure fusion. Hughes is in favour of delaying the operation, should any be required at all, till the patient is at least nine years of age; an opinion which is shared by some good authorities. It resolves itself, in the majority of cases, into a question of the hopefulness of the surgeon and the patience and perseverance of the patient, but it may frankly be admitted that the day for wise operation has not dawned so long as there is hope of securing a good result without its aid; the actual age of the patient is a matter of minor consideration.

In the part dealing with ocular paralysis, the author's treatment of his subject is also very lucid and well expressed. But we confess we do not like his diagrams 43 to 46; he has confused them needlessly by attempting to show on each one the diplopia produced by paralysis of one muscle on the right side and that produced by paralysis of the same muscle of the left eye. This is not calculated to render a difficult matter clearer to a novice. Nor is the height-difference nearly sufficiently emphasized either in diagram or letterpress. We do not think it wise either to classify the muscles into those whose paralysis produces homonymous diplopia and those whose paralysis produces crossed diplopia. It is a fallacious classification, for everyone of any experience has (for example) seen paralysis of the superior oblique in which the diplopia was not crossed and not homonymous. We notice that his charts are subjective; in making them thus he is in accord with a number of writers, others prefer to make them objective.

The volume closes with a useful and appreciative account of Remy's diploscope, an instrument which has hitherto been but little used in this country, and which ought to be better known than it is.

Although some points in Mr. Hughes's book have thus seemed to us to deserve criticism, we have a high opinion of its merits in the main, and recommend it with confidence.

SALZMANN (Vienna). The Pathological Anatomy and the Pathology of Keratoconus. *v. Graefe's Archiv.* Vol. lxvii., 1.

THIS paper is based on the histological examination of an eye from a mentally defective, epileptic girl twenty years of age. During life the eye showed keratoconus with slight opacity, and what appeared to be a hypermature cataract. It was blind. The eyeball was preserved in formalin—formalin-Müller—and finally for eight months in pure Müller before embedding in celloidin. Before transferring to Müller's fluid the eye had to be washed in water,—since the cornea, and especially the conus, had become badly shrivelled in the formalin-Müller. These details are mentioned here as they may help to explain some of the histological changes described by the author. Microscopic examination of the affected portion of the cornea shows thinning of Bowman's membrane and many gaps in its continuity. These gaps are filled with a peculiar connective-tissue, distinguishable from the corneal stroma, and containing elastoid fibres like those found in pinguecula. The same tissue in places passes before and behind the intervening portions of Bowman's membrane so as partly or completely to embrace them. The deeper layers of the corneal stroma in the region corresponding to the summit of the conus (and the thinnest part of the cornea) present some tendency to splitting, with the formation of lacunæ longer than those in the normal stroma. Irregularity of nuclear division is also found in this part of the cornea. In the region of the ectasia, and practically at the centre of the cornea, there is a considerable gap in Descemet's membrane. The free edges are elevated from the corneal stroma, and the endothelial cells have grown round on to their anterior surface. These cells show granular and other changes.

The peripheral parts of the cornea have the normal thickness, and thus contrast with the ectasia in which the thickness of the cornea is reduced by about a half. In the temporal half of the cornea there is a defect of Bowman's membrane, reaching from the margin of the conical part to the edge of the cornea. In this area it is replaced by a fibro-cellular tissue somewhat resembling an avascular pannus. The epithelium rests upon a fine homogeneous membrane which gives the colouring reactions of fibrillary connective-tissue. The posterior surface of Descemet's membrane is covered with a thin layer of connective-

tissue, and, towards the margin of the cornea, between this and the endothelium, there lies a second homogeneous glassy layer. Other changes in the eyeball, having no direct relation to the corneal anomaly, are classified as anomalies of development and acquired pathological changes. The trabeculae of the ligamentum pectinatum are thicker and the spaces narrower than the normal. The sclera reaches its maximum thickness at the equator, and is thicker on the temporal side than on the nasal. The ciliary muscle is of the myopic type. Granules like those found on the cells on Descemet's membrane are also present in the non-pigmented layer of the pars ciliaris retinae.

The lens is cataractous and shrunken. The anterior capsule is wrinkled, and there is a thick anterior capsular cataract.

The optic nerve is almost totally atrophic. In the temporal side of its dural sheath runs a large artery, the significance of which is discussed in another part of the paper. The optic nerve entrance shows the characters of a peripapillary atrophy of the choroid. The retina also shows atrophic changes, but the macula is well preserved.

In the peripheral parts of the retina there is a peculiar growth of the supporting tissue of the retina into the vitreous.

After this description of his own case the author summarises the reports of seven cases in the literature, in which a pathological examination of the whole eye was recorded. He then takes up the pathological anatomy and pathogenesis of the condition. He recognises two types of keratoconus—(1) ectasia confined to the optical zone, no ectasia of periphery of cornea, a shallow furrow at the junction of the cone and the normal cornea: this includes his own case and those of Bowman, Hulke and Jaeger; (2) gradually diminishing thickness of cornea from periphery towards the centre, hyperbolic curvature of cornea as a whole (cases of Rampoldi and Uhthoff). The condition in the second group corresponds with the staphyloma posticum of Scarpa, while the first resembles the staphyloma posticum verum.

Discussing the nature of the cicatricial tissue which fills the gaps in Bowman's membrane, he identifies it with the tissue which fills similar gaps in cases of hydrophthalmos among others. He agrees with Elschnig that it is a regenerated corneal tissue, in the sense that it arises from the fixed cells of the corneal stroma, and that it is formed to fill up the gaps created in Bowman's membrane as a result of the stretching.

But it differs widely from normal corneal tissue, and clinically gives rise to the delicate macular, striate or branching opacities which gradually make their appearance in the apex of the higher degrees of keratoconus.

The gap in Descemet's membrane is also to be referred to the stretching of the ectatic portion. He agrees with Axenfeld that the rupture of Descemet's membrane is not a cause of the keratoconus, nor does he find in his case anything to support Elschnig's view, that the cause lies in some chronic affection of Descemet's membrane and its endothelium.

Assuming that the ectasia can only be due, either to excessive intraocular tension, or to diminished resistance of the cornea, he rejects the former and accepts the latter.

An early ulceration might be suggested as a cause of diminished local resistance, but there is no evidence to support this, while the other aetiological factors which have been suggested such as injury, errors of refraction, anaemia, pregnancy, etc., may all be absent. He therefore falls back on congenital causes. The fact that keratoconus may be a family affection, and that it may be associated with congenital defects, is suggestive of developmental error. Tweedy's theory assumes a developmental failure either in the epiblast at the time of separation of the lens or in the mesoblast at the time of formation of the corneal stroma, but if that is correct how does the defect remain latent up till about the period of puberty?

Salzmann suggests that although the cornea apparently reaches the limit of its growth in the first twelve months following birth, there will be for some time thereafter a progressive strengthening of the fibrillary structure and diminution of the cells, leading to an increase in the rigidity of the cornea. Should this process show a partial failure at the centre of the cornea, we have the condition necessary for the production of keratoconus.

This is of course purely hypothetical, and the aetiology and pathogenesis of keratoconus still await solution.

The author concludes with a few remarks relative to the resemblances between keratoconus and staphyloma posticum. The latter is not present at birth but develops during childhood or at puberty. At the same time we assume for it a congenital basis. It is an ectasia and runs a course like that of other ectasiae. He considers that these two conditions should be grouped by themselves apart from all other ectasiae. They are

peculiar in that they develop without pre-existing inflammation or other disease, in eyes previously normal in form and function, while each of them is situated at one or other of the poles of the eye-ball. They should therefore be distinguished as genuine polar ectasie.

A very full bibliography accompanies the paper.

ARTHUR J. BALLANTYNE.

SACHS (Vienna). **On an Operation for the Cure of Detachment of the Retina.** *Wiener Klinische Wochenschrift*, October 17, 1907.

So long as the exact causes of detachment of the retina are unknown the treatment has necessarily to be symptomatic and to some extent empirical.

The case which suggested the new procedure advocated by Dr. Sachs was one in which one eye had been already lost by detachment of the retina, and for the same condition arising three weeks previously in the second eye the usual treatment of rest, bandage, and subconjunctival injections of salt had been employed without effect. Sachs tried scleral puncture, followed by cauterisation, on five occasions, but this resulted only in temporary disappearance of the separation for a few days after each operation.

It then occurred to him that to be really efficacious the puncture should be made in the position where detachment usually starts and where it becomes most marked, viz., a little behind the equator of the globe, half way between the ora serrata and the optic nerve, the two situations of definite fixation of the retina: adhesions of the retina to the choroid and sclera obtained so far back would act as a dam and prevent the passage of subretinal fluid forwards.

The operation is performed as follows.

The conjunctiva is raised and after fixing a loop suture in the superior rectus or other muscle, as the case demands, it is cut across, the eye is rotated away from the cut muscle and the blade of a sickle-shaped knife passed backwards on the flat over the greatest convexity of the globe. The point is then pressed against the sclera in such a way that it divides that structure equatorially, *i.e.*, in a frontal plane. The subretinal

fluid escapes, the cut muscle is re-attached and the conjunctiva is drawn together by a suture.

In the first case the site of the incision was easily seen the next day by the ophthalmoscope as a whitish line about two disc diameters in length.

Twelve days later a similar operation was done, but this time the external rectus was sectionized instead of the superior. There, however, remained permanently a very shallow separation which had not increased in size even four weeks later, when the field was found to be normal and the vision ($c-7D$ and a weak cylinder) was 6_{18} , some opacity in the vitreous being present.

In another case of high myopia in which detachment had existed for a year three post-equatorial incisions were made, which could afterwards be readily seen by the ophthalmoscope: the field became normal and the retina remained in good position.

In two other cases almost complete replacement was obtained.

In one old standing case no appreciable improvement could be noted.

In the last case recorded the tension before operation was $T-3$ and the condition looked hopeless but equatorial incision produced replacement and return of the tension to normal.

The author considers the procedure well worth further trial. It is not altogether free from the possibility of complications, as in the first case hæmorrhage took place into the vitreous, and in another diplopia resulted from the cutting of the muscle.

At the time of writing, none of the cases had been under observation for a longer period than a month after the operation.

J. GRAY CLEGG.

S. MAYOU. **Ophthalmia Neonatorum.** *Practitioner*, January, February, March, 1908.

RECENTLY there has been quite an "epidemic" of papers upon the subject of Ophthalmia Neonatorum: among them we find an interesting one by Mr. Mayou. Under the head of Sociology of the condition he tells us, among other interesting facts, that at the present time there are in England and Wales very nearly 3,000 persons under 15 years of age who are blind from this terrible disease. The disease, however, appears from the facts brought out in the Census reports to be decidedly less

frequent than it once was. The statistics of certain eye hospitals seem to show, too, that the number of cases of ophthalmia neonatorum brought to them is diminishing. Twenty-seven per cent. of the persons in blind asylums in England and Wales are there on account of ophthalmia neonatorum, but it is now beginning to be possible to distinguish between the pre-Crédé and the post-Crédé periods, and when this can be done the admissions of persons born in the latter period have, in one instance at any rate, gone down to 8 %. Taking various Lying-in Institutions and different periods, he finds that in some at least a great fall has occurred in the proportion of infants attacked by the disease. A striking instance of this is afforded by the Rotunda Hospital in Dublin, where in 1885-7 the proportion of cases of purulent ophthalmia was 0.99, while in 1904-6 it was .009. This fall is certainly due largely to the careful precautions, but we have heard it asserted that in Ireland there is comparatively little gonorrhœa. The author shows how serious is the waste of money involved in the education of the blind children, who with care might have been like their neighbours; they cost about £350,000 annually. The pathology and bacteriology of the process are discussed with care and new points brought out; the fact, not sufficiently well known, we fear, that the gonococcus is by no means the only cause of ophthalmia neonatorum, is emphasized, and the results obtained by a number of observers are contrasted. Apparently the gonococcus is the proved cause in almost 65 %. The clinical aspect of the disease forms an important section of the paper, in which the propriety of the universal application of Crédé's method is discussed from various points of view. Altogether the paper is exhaustive, illuminating, and valuable.

MARX. Prognosis in Retrobulbar Neuritis and Toxic Amblyopia. *Archiv für Augenheilkunde*, December, 1907.

In this paper the author gives notes of 16 cases of retrobulbar neuritis seen by him during the attack and seen again at periods varying from a few months to seven years afterwards. In almost all the cases the onset of the attack was acute, and the vision of the affected eye had fallen to $\frac{6}{60}$ or less. In periods varying from two weeks to two months there was almost complete recovery of vision. The ophthalmoscopic appearance of the disc after recovery was in four cases normal, in seven

there was pallor on the temporal side, and in five the whole disc was pale. In six cases where the nervous system showed no signs of disease at the time of the attack, symptoms of multiple sclerosis subsequently developed, so that although the prognosis as to sight in these cases is as a rule good, that as to general health must always be guarded. The ages of the six patients who subsequently developed multiple neuritis were all between 19 and 23.

A. H. T.

F. P. MAYNARD (Calcutta). **Ophthalmic Operations.** 1908.
Calcutta: Thacker, Spink & Co.

LIEUT.-COL. MAYNARD, I.M.S., is the author of a new handbook on Operations on the Eye, on which he has evidently expended much care, and which is the expression of his matured judgment. We do not review the book, as it is from the pen of one of our Editors; literary propriety forbids more than this mere notice of its existence.

CLINICAL NOTES.

ANIRIDIA. In a case in which a patient with congenital absence of the iris suffered from cataract he found that as the lens became more opaque his usual photophobia and day blindness became less, but, unfortunately of course, vision at the same time failed progressively. After extraction vision again was good, but the day blindness was as bad as ever. In order to give relief to this condition, and allow the patient to use his eye, Valois found that a plate of copper with a cross cut in it was a satisfactory appliance. This was attached to the plane surface of his plano-convex lens (+11D) in such way that it could be removed for the purpose of cleaning the lens. This gave the necessary protection and the patient enjoyed excellent vision and relief from photophobia. The hint might prove useful in other circumstances also.

L'Ophthalmologie provinciale, January, 1908.

AN ARTIFICIAL LACRIMAL SAC.—At the "Versammlung Deutscher Naturforscher und Aertzte," held in Dresden in September last, W. Zimmermann showed two patients in whom, after removal of the lacrimal sac, he had inserted an artificial drain, made of silver, placing it in the *fossa lacrimalis*, and suturing the skin wound over it. He had noted that after extirpation of the lacrimal sac the cut ends of the

canaliculi, at their entrance to the sac, did not become occluded, and was thus led to surmise that a through communication with the nasal duct might be established. He reported four cases, and exhibited two in which two and three months respectively had elapsed since the operation. He expressed the hope that this method of treatment would be given a trial in cases of chronic dacryo-cystitis in which the nasal duct was not the seat of complete obstruction.

AMAUROTIC FAMILY IDIOCY.—In *Le Bulletin Médicale*, November 20th, 1907, Drs. Apert and Dubois report a case of amaurotic family idiocy, which is of additional interest in that it is, according to the report, the first example of the disease observed in France. The patient, aged 11 months, was the child of Jewish parents, emigrants from Poland, and presented all the characteristic features, general and ocular, of the disease. Another child of the same parents had died at the age of two years, with undoubted symptoms of the same malady.

Messrs. Meyrowitz, the well-known opticians of New York, who have now come across the Atlantic for the conquest of London, issue a little pamphlet entitled the "Cult of Eye-glasses," in which they endeavour to encourage the use of that form of visual aid. Certainly it is true that during recent years the improvement in spectacle lenses and in their adaptation to the face has been very great, and in this advance it would be only candid to admit that American opticians have had a large share. In former years one used, and not infrequently, to be told by a quite ordinary-looking patient that opticians "could not fit eye-glasses on my nose; it will not carry them"; one seldom hears that said now. The chief, but not the only, reason for this change has been the lightening of the glass, which now can be made much thinner and to weigh very much less than was formerly the case.

A further triumph in this relation has been the manufacture of bifocal glasses in one piece, which avoids the necessity for a "break" or line of junction. There are objections, of course, to bifocal lenses at any time, but it must be admitted that this new plan removes some at least of these objections, and where such lenses are suitable, this new form is both elegant and advantageous. When the "sutor" sticks closely to his "crepida," we are glad to praise his work: would that he would always do so!

ON NYSTAGMUS.

By A. CHRISTIE REID, M.D., Nottingham.

SOME recent work on nystagmus deserves attention, partly because of its claim to novelty and originality, partly because of its seeming or avowed antagonism with some previous work. It will be the object of this review to examine these claims and to endeavour to reconcile antagonisms where this can be done.

Much ink has been spilt on the question of definition, which is of course of considerable importance. Recently Barany¹ has written on what he considers to be a form of nystagmus distinct from those previously described, originating from the labyrinth of the ear. In his attempt to thus separate a pure form of vestibular nystagmus, Barany has been led to undertake a most interesting series of experiments and observations on normal and pathological subjects. In this article he passes briefly in review the varieties of nystagmus previously described.

His main contention is that his vestibular nystagmus can be separated from ocular nystagmus in such a way that the former may, by its presence or absence, and its conformity to certain laws which he lays down, be used as a diagnostic agent in certain diseased conditions of the vestibular apparatus, cerebellum, etc.

The movements of nystagmus, according to Barany, are of two kinds:—

(1) Pure undulatory, in which the movements to and fro are of equal amplitude and speed about a fixed point.

(2) Rhythmical, consisting of a slow and a quick movement from one fixed point to another, the direction of the rapid movement constituting the direction of the nystagmus, right or left as the case may be.

Barany admits that in some of his cases of vestibular nystagmus—which belongs to the rhythmical type—it was very difficult to say which movement was the more rapid, thus making the distinction between (1) and (2) somewhat artificial. The somewhat arbitrary use of the word “rhythmical” may also be objected to.

Some writers, *e.g.*, Uthoff (quoted by Barany), allow the name nystagmus only to the first group, and name the second “nystagmoid twitchings.” Uthoff further considers that the second group indicates a paresis of the oculo-motors, but Barany traverses this view, and states emphatically that his rhythmical nystagmus has nothing to do with paresis; if, he says, a muscular paresis is present in any case which also shows a rhythmical nystagmus the name nystagmoid twitching ought to be applied to such a case.

In the present somewhat chaotic condition of our views on this point of definition, it would be invidious to select and impertinent to dogmatise; but I think something is gained by the concept that every movement of the eyeball that may in the broadest sense be termed nystagmus is a *movement of recovery*. This view would lead us to define—or rather expand into a definition—the notion of nystagmus as “any succession of movements of the eyeball directed towards the recovery of disturbed equilibrium.” Further subdivision of the concept may aid, but this should proceed along well-marked lines under the guidance of leading principles. Thus we may ask what it is that disturbs the equilibrium of the eye in a given case. Has that equilibrium ever been consistently maintained (congenital nystagmus due to the fact that yellow spot fixation has never been established)? If once maintained and then disturbed, is this disturbance merely temporary (Barany’s vestibular nystagmus) or permanent (the slow searching nystagmus of senile cataract, also many cases of miners’ nystagmus even in the primary position); or only

capable of disturbance in strained, unnatural positions (many cases of miners' nystagmus, the nystagmus of disseminated sclerosis, etc.)? Again, the difficulty of maintaining equilibrium may be due to fatigue or even paresis of the muscles involved in a position of strained equilibrium (Snell's recent cases, *vide infra*).

This is anticipating somewhat the conclusions of this article, but it is necessary at this stage, before approaching the work recently done, mainly by Barany and Snell, to be able to carry in one's mind a somewhat broader view of nystagmus in general than is prevalent to-day. The claim here made is that the conception of nystagmus, as being first and foremost an expression of a disturbance in the equilibrium of the eyeball, may serve as the uniting bond of several rival theories. A careful consideration, moreover, of the work of Barany and Snell has convinced me that it is only under the influence of this conception that any real progress will be made in the elucidation of the problems connected with these movements of the eyeball.

I look on Barany's work also as largely confirmatory of the theory of miners' nystagmus put forward by me in *Brain*: and this despite the fact that Barany does not hesitate to set aside this peculiar form of nystagmus as having an ætiology of its own. Barany has not studied this form at first hand. He says: "I have had no personal experience of miners' nystagmus. According to the descriptions one has to do with a paroxysmal undulatory nystagmus, coming on especially in bad light and when the gaze is directed upwards, which two characters serve to distinguish it from vestibular nystagmus . . . a pure undulatory nystagmus is never found in labyrinthine nystagmus."

To reply to this in detail is not the purpose of this article, but I would here remark (1) that Barany has not studied miners' nystagmus in relation to possible labyrinthine disturbances; (2) that though he has described a vestibular

nystagmus of his own, he is not justified in concluding that a more complex disturbance of the vestibule might not produce a more complex nystagmus.

The great object of his experiments on the human subject is to demonstrate a close and exact correspondence between a certain eye movement and irritation of a certain semi-circular canal; he attains this by eliminating as far as possible all irritation of the remaining canals, and finds that his results agree in the main with the results of more exact experiments in animals. But from his work itself it is clear that unless such secondary irritation is eliminated the resulting ocular movements are more complex and more difficult to describe. If we go a step further and postulate a rhythmical disturbance of the canals in succession, such as may be assumed to be probable in connection with the miners' swinging movements at the coal face (*vide* article in *Brain*, referred to) surely we are well on the way to accept a theory of this form of nystagmus that seems to me to bring it alongside of a vast amount of experimental work on eye movements in general.

Barany's reviewer in *Brain* (1906, Part iii.) seems to follow him in thus separating two distinct forms of nystagmus and in emphasising the importance of the distinction. Thus "two distinct forms of nystagmus may be observed under different physiological and pathological conditions, of which one is known as undulatory, and the other as rhythmical nystagmus. The second is the form which is associated with stimulation of the vestibular organ."

But when we come to examine Barany's physiological vestibular nystagmus we find that he is able to differentiate distinct types of this only by an *experimental and partial* stimulation of the vestibular organ. It will suffice here to mention the simplest type, viz., horizontal nystagmus. This can be produced in a normal individual by seating

him erect, with the gaze directed straight forwards, on a revolving stool. After directing him to close his eyes and rotating 4—6 times, at the rate of 3 or 4 seconds per complete revolution, on opening the eyes the nystagmus is generally evident, but is made much more so by directing the gaze towards a finger held at a distance of $\frac{1}{4}$ — $\frac{1}{2}$ metre from the eye observed, and to one or other side as the case may be, *e.g.*, with rotation towards the right (in the direction of the hands of a watch regarded as lying on the ground face upwards, a direction which may be described as positive) the nystagmus, on cessation of the rotation, is a left horizontal, *i.e.*, the quick movement is towards the left, followed by a slower falling away, and this nystagmus is much more evident on looking towards the left. But if the axis of rotation is not exactly vertical, or if the head is inclined in the least forwards or backwards or to either shoulder, we no longer get a pure horizontal nystagmus; it becomes more or less diagonal, with perhaps a rotary component.

Barany's further work—on nystagmus caused by syringing, etc.—shows that his rhythmical movements are due to stimulation of one side only. Take, for example, the pure horizontal left rhythmical nystagmus: here the active movement towards the left is followed by a passive movement, slower, towards the right. But if we could, at the moment of commencement of this slow passive movement, by stimulation of the corresponding canal on the other side, produce an active quick movement towards the right, then our rhythmical is at once converted into an undulatory nystagmus.

Therefore it seems that the above statement, that "the second (rhythmical) is the form which is associated with stimulation of the vestibular organ," loses its value, and the distinction between a rhythmical (vestibular) and an undulatory (ocular) breaks down. In other words, I hold that a rapidly alternating stimulation of the vestibular

organ on each side may produce an undulatory nystagmus, and thus such a nystagmus may be fairly described also as being of vestibular origin.

It is not quite clear what Barany does mean by "ocular nystagmus"; nor is it at all evident that ocular afferent impulses are excluded when his vestibular nystagmus is produced; in fact they are not, for the nystagmus is only evident when the eyes are opened. And, according to the evidence brought forward in the article in *Brain* above referred to, such a succession of stimuli to the canals is extremely probable in the case of miners working at the coal face. Hence the claim that miners' nystagmus is mainly of vestibular origin is largely supported by Barany's work.

Another paper³ on this subject has been brought to my notice, but the reasoning is purely deductive and the conclusions indefinite. The writer confesses that he has "not had personal experience with this form of nystagmus," and is too ready to accept unproved hypotheses, such as "the ability to work eight hours or more with the eyeballs directed upward."

Barany's work also renders very doubtful the assumption, largely insisted on in Snell's monograph⁶ that because the nystagmus comes on or is increased in certain directions of the gaze, therefore there is a fatigue, a weakness, or even a paresis of the muscles involved in that forced movement. Though in the case of a positive rotation about a vertical axis the ensuing nystagmus is a left horizontal it would be more than gratuitous to assume that there was a fatigue of the muscles directing the gaze to the left.

Such a fatigue, weakness, or paresis may of course be present in the ocular muscles, but it is doubtful whether it could ever lead to more than a compensating twitching when the muscles are put on the strain. This would be analogous to a fatigue tremor in any other group of muscles; and this would seem to be the nature of the

nystagmoid twitchings in most of Mr. Snell's recent cases.² In others of these cases, however, other causes were at work which tended to upset the equilibrium of the eyes and to lessen the power of steady fixation.

Another factor of no little importance in causing disturbance of equilibrium of the eyes, as of the body generally, is the alcoholic habit. I have been able several times to demonstrate nystagmoid movements in alcoholic subjects, in whom no fatigue of any special group of muscles could be postulated. Barany promises to give us ere long the results of his observations on rhythmical nystagmus in cases of acute alcoholism.

But as disturbance of the equilibrium of the body cannot be ignored as a possible factor in the production of disturbances of equilibrium of the eyes, this ought not to be lost sight of in arriving at a valuation of Mr. Snell's cases.

In the six compositors quoted this factor was not in evidence, and the nystagmus was of simple up-and-down character when present.

But in the case of William G., the sanitary pipe maker, in whom the subjective sensations, and presumably also the nystagmoid movements, were "up and down, and also across, not very often in circles," the forced positions of the body when at work, *e.g.*, "a quarter of an hour or more bent down without rising from that position," together with the swinging movements of throwing the clay into moulds, surely had something to do with the disturbance in the equilibrium of the eyes.

So with the case (Harry M., p. 15) of the man working in the cage: he was "stooping unless he sat," and though "there was no definite nystagmus on examination, on looking up the eyes were certainly unsteady"; here, too, there had been a strain on the equilibration centres.

The case immediately following (H. J., p. 16) showed

"movements rotatory, and vertical up and down, readily brought on by looking upwards: some giddiness and intolerance of light"; this man also had to work in positions which tended to upset the equilibrium of the body.

Mr. Adams Frost's man, who "every night hung up as many as fifty sets of harness," presumably had to stand on tiptoe while reaching up to the harness pegs, and this while holding a heavy weight above his head, throwing the head backwards and looking upwards, would certainly tend to disturb his equilibrium.

In several of these cases there was a further factor present, viz., deficient light, which, by rendering fixation of the eyes more difficult, assists any other factors that may be present tending to disturb the equilibrium both of the eyes and the body generally. This factor was somewhat modified in the case (Abner H., p. 21) of the youth who sharpened chisels, presumably at a glowing furnace; here the alternate dark and light adaptation required must have lowered the fixing functional activity of the yellow spots, thus leaving the fixation more or less under the control of other reflexes; and if the normal working of these is disturbed by any influence—alcoholism, constrained positions of the body, rhythmical swinging movements—ocular instability, may be definite nystagmus results.

A general review of the work of Barany and Snell further confirms me in my view of a similar complex aetiology for miners' nystagmus.

The clinical diagnostic side of Barany's work may be referred to in closing. It has been taken up by others, *e.g.*, Neumann,⁵ who regards Barany's differential tests for lesions (*a*) of the cerebellum, (*b*) of the labyrinth, as being of considerable value. But on this question the final verdict of the aurists has not been given.

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REVIEWS.

AXENFELD (Freiburg, Baden). **Spring Catarrh.**

THIS monograph of 134 pages embodies the report on Spring Catarrh presented to the French Ophthalmological Society at its congress in 1907. The author has spared no pains in his endeavour to give a complete account of this curious and in many respects puzzling affection. Besides containing a critical and careful analysis of all the available literature on the subject, the value of the report is considerably increased by the author's original investigations on the pathological anatomy of the disease and on the condition of the blood which is associated with it, as well as by the views as to treatment, etc., which he has elicited in response to letters addressed to many ophthalmologists.

The subject matter is divided into the following sections:—History, clinical symptoms and diagnosis, bacteriology, alterations in the skin due to light, general state of health, including the condition of the blood and nose, pathology, and finally treatment. It would obviously be impossible to do justice to the author in the limited space of a review, and our purpose will be best served by presenting a summary of the conclusions at which he arrives as the result of his labours.

The palpebral growths in Spring Catarrh are the result of an inflammation of the subconjunctival connective tissue, with secondary proliferation of the epithelium. In the bulbar proliferations the epithelial changes may precede the inflammation of the conjunctiva, but this point requires further investigation. The disease starts in the adenoid tissue, but this is soon followed by an accumulation of plasma cells, and then the hypertrophied stroma becomes sclerosed or hyaline. The epitarsal elastic fibres increase, but have very little to say to the conjunctival proliferations. In the stage of retrogression the plasma cells degenerate, while the mast cells and the hyaline degeneration increase. The milky opalescence of the surface is caused by hyaline thickening of the subepithelial connective tissue.

The pathological appearances bear some resemblance to those of rhinoscleroma, and may, or may not, be caused by micro-organisms. The influence of light may perhaps be sufficient in itself to act as a cause, as it certainly does in certain dermatoses.

Eosinophil cells are often, but not constantly, found in the conjunctival proliferations, while their increase in the blood is much rarer. On the other hand, as first pointed out by Herbert, they are surprisingly numerous in the conjunctival secretion.

Alterations in the blood are found in Spring Catarrh much more frequently than has been suspected up to the present. They consist not so much in an absolute increase in the white corpuscles, as in a relative increase of the number of lymphocytes. It would be important to determine to what constitutional condition this peculiarity is due.

Under the influence of a bandage, or by exclusion of light by other means, the proliferations undergo a remarkable diminution in size and sometimes disappear. Nevertheless it remains doubtful whether light is really the active agent in the causation of the disease, since many cases begin, or relapse, without any definite relation to periods of insolation, and moreover, the great irradiation of light from the Alpine snows does not generally cause relapses. Acting on the supposition that the ultra-violet rays are important factors in the development of the disease, as in æstival dermatoses, Axenfeld proposes to try the effect of covering the lids with an impermeable varnish containing quinine, or of protecting the eyes by glasses con-

taining a solution of the drug, which destroys the ultra-violet rays by changing them into fluorescent rays. It is rare, however, for Spring Catarrh to be associated with skin diseases, and when this occurs it is probably only a coincidence. Excision of the fibrous conjunctival growths does not usually prevent relapses, and should only be performed in severe cases, and then the tarsus may be partially removed. This operation is rendered more effective by combining it with cauterisation or electrolysis. Local treatment by drugs seems only to have the effect of relieving the symptoms, and the author states that he knows of no cases having a duration of less than four or five years. The drugs used are too numerous to mention: amongst them are white precipitate, dilute acetic acid (to relieve itching), adrenalin, salicylic acid, ichthyol, antipyrin, etc. Massage, cold or iced applications, or warm fomentations have also been approved of. X rays and radium have, of course, also been tried. Indeed, the multiplicity of the remedies employed is, as usual, inversely proportional to their efficacy.

An exhaustive bibliography and some excellent coloured plates are appended to this very interesting and valuable work.

L. W.

PASCHEFF (Sofia). **New Communications on Spring Catarrh.**
Archives d'Ophthalmologie, February, 1908.

(A) *The migration of mast cells in Spring Catarrh.*

In a previous paper the author drew attention to the migratory character of the mast cells of Ehrlich, and has since then studied histologically two fresh cases of spring catarrh, using Giemsa's method of staining, and comes to the following conclusions:—

- (1) That the migration of mast cells in spring catarrh is not characteristic of this disease, as it has been found to occur in trachoma.
- (2) That the mast cells of Ehrlich are not immobile white corpuscles as stated by Letulle, neither are they fixed cells as Ehrlich imagined. They are mobile lymphocytes with granular basophile protoplasm, multiplying in the conjunctival tissue, and derived either from the blood or, as is more probable, from the walls of the blood vessels.

(B) Contribution to the bacteriology of Spring Catarrh.

The author has also examined eleven cases of spring catarrh bacteriologically. In two he found staphylo- and streptococci. In four the result was negative, and in five a bacillus was found which resembled very closely the bacilli of the pseudodiphtheritic group and particularly the xerosis bacillus. It was found however to possess the following distinguishing characteristics:—

- (1) Possession of a capsule which is unstainable by the ordinary methods.
- (2) Growth on gelatin at the temperature of the room.
- (3) Production of acid.
- (4) It is pathogenic for the vitreous.

It is found frequently in spring catarrh (5 out of 11 cases examined by the author) and is distinguished by the above characteristics from the bacillus xerosis and Hoffman Læffler bacillus. It grows in the conjunctiva in small colonies and especially well at the limbus. The appearance produced here is clinically identical with the limbal change so well known in spring catarrh.

J. BURDON-COOPER.

H. FRENKEL. **Lumbar Puncture in Optic Neuritis due to Intracranial Hypertension.** *Annales d'oculistique*, January, 1908.

RECENT experiences show that lumbar puncture is a valuable therapeutic measure in a variety of diseases in which intracranial hypertension is a prominent symptom, *e.g.*, cerebral tumour, tuberculous and non-tuberculous toxi-infections, meningitis, hydrocephalus, and meningeal hæmorrhage (except pachymeningitis hæmorrhagica). Favourable results have been recorded in uræmia, vertigo, tinnitus, deafness from labyrinthine disease, psychoses, chorea, tabes, incontinence of urine, whooping cough, hysteria, zona, hemiplegia, and traumatism.

In cerebral tumour and tuberculous meningitis this treatment can only be palliative and the relief but temporary. In the case of cerebral tumour the treatment must be employed with prudence and caution as it may be followed by recrudescence of the nervous symptoms and even sudden death. In hydrocephalus the results are very variable and success can

only be expected when the treatment is employed before optic atrophy has supervened and the punctures are frequently repeated with liberal evacuation of the cerebro-spinal fluid.

It is, however, in serous meningitis that the most striking results have been obtained from lumbar puncture. The symptoms of serous meningitis are somewhat vaguely defined and differ in degree rather than in character from those of suppurative meningitis. The classical symptoms—headache, vomiting, and constipation—are present but are not very severe. Feverishness, rapid pulse, mental, motor and sensory disturbances are also less marked, whilst remissions are more frequent and of longer duration than in septic meningitis. The diagnosis must be confirmed by finding optic neuritis (Quinke) and increase in quantity of the cerebro-spinal fluid, the evacuation of some of which quickly leads to alleviation of the symptoms (Fr. Schultze). Serous meningitis may arise from otitis media, from various infectious diseases such as measles, typhoid fever, influenza, pneumonia, acute rheumatism, and suppurative pericarditis. Even cold and traumatism have been ascribed as causes. Probably a certain number of cases of acquired hydrocephalus arise from serous meningitis.

Frenkel's case was that of a servant girl, aged 21 years, whose family and personal history did not throw any light on her complaint. For five months before admission she had suffered from pains in the temples and nape of the neck. During the last month these had been associated with photophobia, diplopia, and rapid failure of sight. For three months she had been troubled with vomiting unrelated with food.

On examination she was found to have marked blepharospasm and photophobia, convergent strabismus, and some ptosis. Externally the eyes were normal and the pupils were active. Ophthalmoscopically it was found that she had marked neuro-retinitis with swelling of the discs, effusion over the vessels on the discs, and marked dilatation and tortuosity of the veins.

The patient could only get about with great difficulty and the vision and fields could not be taken.

The temperature varied from 97° to 99·5° F. during her stay in hospital, and was often of the inverted type. Pulse about 100, also often of inverted type. Respiration was normal on admission. Urine normal.

Intramuscular injection of 'huile grise' (0·45 c.gr.) was

administered. On the day after, she developed violent headache and vomiting, with clonic convulsions of upper and lower limbs and delirium. Next day she became semi-comatose and though there occurred a subsequent improvement in her condition and convulsions were less frequent, there remained marked muscular weakness in all the limbs.

Lumbar puncture was now performed. The fluid escaped in a jet and 8 c.c. were evacuated in 30 seconds. The cytological examination of the fluid was negative. Immediate improvement in the symptoms followed, though the muscular power remained weak. There was a Babinski reflex next day and in the evening convulsions returned for about five minutes.

Four days after the first puncture a second puncture was made and about 6 c.c. of fluid evacuated. For two days after this she was much better and then she suddenly developed epileptiform convulsions in the limbs, face, and thorax, with polypnoea and dyspnoea and accelerated pulse. With short intermissions these clonic and tonic convulsions recurred several times during the succeeding ten days and then they stopped, headaches disappeared, respiration and pulse became normal, photophobia became insignificant and appetite improved. $V = \frac{1}{6}$ in each eye. Optic discs showed very little swelling and no exudation. Visual fields a little contracted. Some anæsthetic areas remained on the arms and a hyperæsthetic zone on the thorax. Muscular power was also feeble. There was no Babinski reflex and no mental trouble. Calmette reaction—twice applied—was negative.

Within two months after admission fundi and vision were normal and general health good. Injections of huile grise, in doses of .045 c.gr., were given seven times during her stay in hospital.

Frenkel regards his case as one of serous meningitis with a tendency to hydrocephalus. The absence of localizing symptoms and the result of treatment exclude cerebral tumour. Tubercular meningitis was excluded by the negative Calmette reaction. The cytological examination and the history also suggest that the case was not one of syphilitic meningitis, though it is impossible to disprove a syphilitic origin, and the anti-syphilitic treatment may have played some part in the cure and may have favourably influenced and prolonged the effects of the two lumbar punctures.

It will be noted that the convulsive seizures and the respira-

tory and sensory disturbances were aggravated rather than relieved by the lumbar punctures and as they were relieved on one occasion by pressure on the ovaries they were regarded by Frenkel as of hysterical origin. It is quite possible, however, that the inverted type of temperature was the result of intracranial hypertension on the nerve centres.

J. JAMESON EVANS.

LAGRANGE (Bordeaux). **The Filtration Cicatrix in the Cure of Glaucoma. Varieties of this Cicatrix after combined Sclerectomy and Iridectomy.** *Archives d'Ophthalmologie*, February, 1908.

Is the filtration cicatrix useful in the cure of glaucoma? This question Lagrange thinks can only be answered in the affirmative, for whatever theory we hold as to the primary cause of glaucoma the necessity of giving exit to the pent up intra-ocular fluids by operation can hardly be disputed. The measure of success or otherwise attained by operative interference is, Lagrange thinks, intimately connected with the capacity for filtration of the cicatrix so produced. This capacity for filtration is influenced by the degree of hypertension of the eye acting in such a way as to interfere with the normal process of repair and producing an inexact coaptation of the lips of the wound. The healing process varies with different cases. In acute glaucoma the cicatrization of the wound takes place under pressure and it becomes ectatic enough to allow of the liquid filtering. The cicatrix is even more permeable when the surgeon despite himself has allowed the iris to get entangled in the wound—when the iris is not entangled the cicatrix is slightly thinned and ectatic and the filtration is directly proportional to the separation of the lips of the wound. In irritative and chronic glaucoma with increased tension, it is, according to Lagrange, still the cicatrix which explains the success, more or less lasting, of iridectomy. In chronic glaucoma, where the tension is low and perhaps intermittent, coaptation is exact from the first and the operation valueless.

The filtering cicatrix which results from iridectomy is the direct outcome of the increased tension. When this is normal the cicatrix does not filter at all and the length of time it continues to do so varies according as the tension is more or less

raised. When a filtration cicatrix is obtained in an eye with increased tension it loses its capacity of filtering in the measure in which the cicatricial tissue filling in the wound becomes sclerosed.

Lagrange maintains that it is impossible to produce a filtration cicatrix by diuresis alone—exeresis is necessary to produce a permanent result. Combined operation based on this idea is now well known, and it is hardly necessary to do more than allude to its leading features. The incision is made with a Graefe knife which is entered about 1 mm. behind the limbus and the counter puncture made at a corresponding point. The incision divides the sclera in the mid-corneal angle, and in making it the edge of the knife is directed backwards so as to bevel the sclera. In completing the section a large conjunctival flap is made. This is raised and turned forwards and a piece of sclera is resected from the distal lip of the incision by suitably curved sharp scissors. An iridectomy is performed in the usual way and reposition of the conjunctival flap completes the operation.

Lagrange draws a strong distinction between the filtering cicatrix so produced and the cystoid cicatrix of other writers. The former is free from all adhesion to the uveal tract whereas the latter is consecutive to enclysis of the iris.

Different types of the filtration cicatrix and the causes which modify their external characters.

Three types are described and they depend on the amount of sclera resected and the hypertension existing in the eye.

The first, which is simply a thinning of the sclera, occurs when the thin end of the scleral wedge alone is cut off, so that the external layers of the sclera only are wanting and conjunctiva smoothly covers the wound.

The second type (sub-conjunctival fistula) is produced when the whole thickness of the sclera has been excised. The fistula corresponds in size to the amount of sclera removed. That it remains flat depends on the fact that the tension of the eye at the time of operation was little or nothing above the normal.

The third and commonest type, in which an ampulliform swelling forms, occurs in those cases in which the excision has been a large one, and where the tension and hypersecretion are sufficient to force the intra-ocular liquid under the conjunctiva.

Lagrange insists on the importance of the tension in deter-

mining the form of the cicatrix, he also believes the extent of the sclerectomy ought to be in the inverse ratio of the increase of tension. Thus with a $T+3$ the wound gapes sufficiently for a filtration cicatrix to be established by simple iridectomy alone. With $T+2$ a small sclerectomy is indicated, and with $T+1$ and under the sclerectomy ought to be large.

In conclusion, Lagrange claims for his operation that it gives a cicatrix which is quite detached from the uveal tract: that it brings the perichoroidal lymph space and the chambers of the eye into communication with the sub-conjunctival cellular tissue: that the filtering cicatrix thus produced suppresses increased tension in the glaucomatous eye and that the latter, relieved of its hypertension, is cured "in so far as the surgeon is able to cure it."

J. BURDON-COOPER.

H. B. YOUNG (Iowa). **Some Experience with Simple Glaucoma and Conclusions Therefrom on the Relative Value of Operative and Non-operative Treatment.** *Ophthalmic Record*, December, 1907.

THE writer in this article gives his views on the vexed question of whether simple glaucoma should be treated by myotics or operation, and calls attention to the want of harmony there is among ophthalmic surgeons with regard to it. He says that the discussion cannot be ended so long as the following questions remain unanswered:—(1) What is the pathology of glaucoma? (2) How shall we distinguish non-inflammatory from inflammatory glaucoma? (3) What is the measure of relief attainable in this disease by either mode of treatment? On the first question the writer has nothing to offer. With regard to the second he quotes Schweigger's statement that a dilated sluggish pupil and shallow anterior chamber preclude the diagnosis of simple glaucoma and mean on the contrary inflammatory glaucoma, though perhaps dormant. He also quotes Abadie's declaration that simple glaucoma is glaucoma of the posterior segment of the globe, while glaucoma of the anterior segment is inflammatory.

The writer deprecates the loose way in which the terms simple glaucoma and chronic glaucoma are sometimes used, as though they were synonymous.

Following Schweigger he thinks that the term simple glaucoma should be limited to those comparatively rare cases in which there is a normal pupil and normal anterior chamber, and that all cases which present a dilated sluggish pupil and distinctly shallow anterior chamber should be classed as inflammatory, either chronic or acute.

Examples are given of the former class which remained throughout free from inflammatory symptoms; and of the latter which always ended sooner or later in an inflammatory attack, unless operated on.

Keeping this classification in view the writer considers that in the first category all treatment, whether operative or non-operative, is palliative only; and that taking into consideration the risks of operation, though the balance of evidence may be in favour of the operative method, it is not great enough to warrant criticism of the surgeon who says to his patient "take your choice."

On the other hand when there is a dilated, sluggish pupil and shallow anterior chamber, however free from inflammation the case may seem to be, the writer upholds the opinion that the evidence is so overwhelming in favour of operative treatment that it is the duty of the ophthalmic surgeon to apply it.

CHARLES BLAIR.

HANKE and TERTSCH. **Some rare Infections of the Eye.**
Klinische Monatsblätter für Augenheilkunde, December,
1907.

WE have here an account of four cases of acute inflammatory affections of the eye which possesses considerable interest from the results obtained by bacteriological examination.

The first of these was that of an infant eight days old suffering from a purulent ophthalmia in both eyes: in the secretion the writers found a bacterium which, from microscopical examination and cultural appearances on different media, they concluded was the *bacillus pyocyaneus*. This bacillus is known as a cause of acute infection in eye diseases but it is very rare. The cases in which it has been most often found are those of necrosis of the cornea leading to panophthalmitis, but one case of conjunctivitis and one of superficial keratitis due to the same cause have also been reported. This is claimed to be the

first recorded case of ophthalmia neonatorum due to the bacillus pyocyaneus.

The second case refers to the discovery of the *micrococcus intracellularis meningitidis* in the purulent discharge that escaped from the interior of an eye. The patient was an infant of some seven months who developed pneumonia: a week later it was found that in one eye there was a typical metastatic ophthalmia (chronic iridochoroiditis with exudation in the vitreous) which went on to spontaneous rupture of the globe. By a close analysis of the results of various cultivations that were made and a comparison with other non-gram-staining cocci (gonococcus, and micrococcus catarrhalis) the microorganism obtained from the pus was judged to be the diplococcus above-mentioned.

Metastatic ophthalmia occurs in 4—5 % of cases of epidemic cerebro-spinal meningitis: it is usually unilateral, although in some cases it affects both eyes. It appears simultaneously with the meningitis, but not infrequently in the first to third week of the disease, as an insidious iritis with hypopyon and exudation in the pupil and an absence of any ciliary congestion, which very soon leads to typical pseudo-glioma. The characteristic yellowish reflex seen in the depth of the pupil is often the first symptom to draw attention to this complication. Microscopical examination of eyes so affected tends to show that infection is carried to the globe by way of the blood vessels, not along the subdural or subarachnoid spaces as might be expected. In connection with this case it may be further noted that spontaneous perforation has been reported in only one other case of the same kind, that a bacteriological examination *intra vitam* has, though done in this case, been seldom possible, and that there was no evidence that the infant had been brought into contact with any person suffering from meningitis.

The third case was one of ordinary ulcus serpens. The diplococcus pneumoniae is, as is well known, the microorganism most usually found in this disease, although in some cases the diplobacillus of Petit, the Morax-Axenfeld bacillus, and more rarely the pneumobacillus, the bacillus subtilis, streptococcus, and proteus are the cause of the infection. The characters of the bacterium found here led the authors to include it in the group of the *bacillus proteus vulgaris*. The proteus vulgaris is regarded as generally possessed of little virulence unless the resistance of the tissues has been first reduced by the action of

other bacteria present: it will then grow and help the growth of the latter. In some instances, however, as here, it shows great virulence.

The presence of *proteus vulgaris* has been reported in other eye affections: in a case of conjunctivitis during measles, in mucocele, and in panophthalmitis.

The last case was one in which panophthalmitis set in with extraordinary rapidity after an injury. A young man was hit with a piece of iron in the eye, and within some eight hours the eye showed signs of panophthalmitis and was enucleated on the following day. Microscopical examination revealed the presence of numerous gram-staining bacilli, but it was impossible to make a culture of them, except a very small growth in serum agar. The great virulence of this bacillus was shown by the rapidity with which the panophthalmitis set in, as well as by the necrosis involving the retina and uveal tract. It was impossible to classify this bacillus, although at the first glance it was supposed to be the bacillus subtilis, and in certain characters resembles the bacillus perfringens observed by Chaillous in a similar case. This may perhaps be a case of a bacterium, which is normally non-pathogenic, acquiring, if only temporarily, strong pathogenic properties when it gets into the eye through a perforating wound.

THOS. SNOWBALL.

V. PELUGK (Dresden). **On Oily Collyria, with special reference to Acoin-Oil.** *Klinische Monatsblätter für Augenheilkunde*, December, 1907.

THE practice of using oil as a vehicle for drugs in collyria is one that has been extensively followed in France, although it has never found favour either in Germany or in this country. Oily solutions are claimed to have certain advantages over the ordinary aqueous ones: when sterilised they will remain so for a long period, while an aqueous solution of cocaine, for example, very quickly shows the presence of fungi. Moreover, oily solutions of eserine, pilocarpine, cocaine, and acoin are absolutely non-irritating, so that when introduced into the conjunctival sac they do not excite lachrymation and hence are not liable to dilution, while they come into more intimate contact with the conjunctiva and cornea. As a consequence of this their action is more pronounced and more lasting. The

oily solution of eserine never alters its colour, and cocaine-oil does not injure the corneal epithelium. Every drop of an oily solution placed in the sac can be controlled, whether it remains in contact with the conjunctiva or is washed out with the tears, and hence the use of these solutions renders more accurate dosage possible—a matter of importance particularly in children.

The author has made extensive trial of these oily collyria, and particularly with acoin (a substitute for cocaine), which has in his opinion never found the place in ophthalmic practice which it deserves. Darier praises it as an anæsthetic before making subconjunctival injections: he does not think it offers any advantage over cocaine when used in solution on the conjunctiva, but has found it of great service in the form of an ointment in burns and abrasions of the corneal epithelium. But v. Pflugk employs acoin in a 1 % solution of arachis-oil in all painful conditions of the eye with most gratifying results. He emphasises the fact that in oily solutions acoin has no influence on the intra-ocular pressure, the pupil, or on accommodation: it does not act injuriously on the corneal epithelium, it is absolutely non-irritating, and in the great majority of cases its anæsthetic effect is almost instantaneous, and lasts for a number of hours.

If the solution of acoin is made stronger than 1 % or if it is kept exposed to daylight it is apt to give rise to slight burning along the edges of the lids, but in the above strength the results have been so satisfactory that v. Pflugk considers acoin the best analgesic for the eye at our disposal. THOS. SNOWBALL.

J. GALEZOWSKI. **Pre-retinal Hæmorrhages.** *Recueil d'Ophthalmologie*, September, 1907, p. 513.

THE author remarks on the frequency with which cases of this order have been recorded by English surgeons: in France such cases appear to be much less frequent.

He narrates the appearance of three cases which had come under his care, and the microscopic findings in a fourth.

Case 1 occurred in a man of 25 of healthy habit and good history. The fundus of the eye for its posterior half was veiled by a thin sheet of blood, so thin that the disc could be dimly seen through it: Its margin reached the equator, where it was bounded by a distinct red line. At the end of three weeks the

blood had been absorbed, the fundus could be seen, and the source of the hæmorrhage located in a twig of the lower and outer branch of the central artery, which was white and bloodless. At a later date circulation through this vessel was re-established, and vision and field were normal.

Case 2, a lady aged 60, the subject of glycosuria, with the classical features of diabetic retinitis, had a hæmorrhage confined to the anterior retinal region, about the ora serrata. There was again a distinct red line limiting the hæmorrhage, but the hyloid had been penetrated in parts, for there were masses floating in the lower part of the vitreous. In the right eye the conditions were similar but less distinct.

Case 3, a lady aged 30, in the 7th month of pregnancy, had a severe attack of vomiting, and there was a sudden loss of sight in the right eye. The macular region was covered by a large red patch about thrice the disc in diameter; the blood settled into the lower part, and from the lower edge of the patch a fringe appeared, due to diffusion of the blood into the retina. Vision was reduced to $\frac{1}{50}$.

Case 4 was that of an eye excised for hæmorrhagic glaucoma. The retina was detached and supported by a greenish coagulum. At the fundus of the eye were a number of circular patches, some in the thickness of the retina, others immediately preretinal, and some in the vitreous. Some of the patches were remains of old hæmorrhages for the rim of the patch contained strings of fibrin stained black from aggregation of the blood pigment.

In comparing his observations of the histology of preretinal patches with those of Fisher, he was unable to find that the blood was bounded on each side by a membrane as did Fisher, and concludes that the hæmorrhage had torn off the anterior limiting membrane of the retina and so was strictly speaking a retinal hæmorrhage.

There is a bibliography in which British names figure largely.

N. BISHOP HARMAN.

SCHIELE. Calmette's Ophthalmo-reaction in Tuberculosis and Trachoma. *Wochenschrift für Therapie und Hygiene des Auges*, December 5, 1907, p. 73.

SCHIELE tried the ophthalmo-reaction in 68 subjects in October of last year. All were sufferers from eye disease save eight

who were ill from some form of general or "surgical" tuberculosis.

But of the eye cases very few were tubercular, for of these 62 as many as 54 were marked as free from tubercle and most were in "good health." They were for the most part suffering from trachoma or follicular conjunctivitis.

The results obtained may be shown in tabular form:—

	No. of cases.	Positive reaction.
Trachoma	27	18
Follicular conjunctivitis ...	11	9
Phlyctenular conjunctivitis .	4	3
Leucomata	1	1
Tubercular Kerato-iritis ...	1	1
Sundry external diseases, chalazion, epiphora, etc....	14	0
Interstitial keratitis (syphilis)	2	0
Phthisis and surgical tubercle	8	7

From the results he concludes that it is futile to attempt to utilize the reaction as a test for tubercle when there is any degree of trachoma or of follicular conjunctivitis. Further, he says that the readiness with which cases of follicular conjunctivitis of the simplest order, as well as cases of trachoma, give positive reactions, goes to prove that all the former are really trachoma though of a mild type!

Calmette's reaction is *sub judice*, so any evidence as to its effect in tubercular and non-tubercular cases is important. Should Schiele's findings, that a positive reaction is readily obtained in such common and trivial complaints as follicular conjunctivitis, be established, then its range of utility will be small.

The letter of Parkes Weber in the *British Medical Journal*, Feb. 15, 1908, p. 386, should be read in this connection: He states that the solution placed in the eye of some of his hospital colleagues, who were in perfect health, produced a positive reaction *if they read all the succeeding evening*.

N. BISHOP HARMAN.

HAASS. **On the Treatment of Tubercular Iritis by the Injection of Air into the Anterior Chamber.** *Wochenschrift für Therapie und Hygiene des Auges*, September 5, 1907, p. 386.

IN 1902 Felix described a new mode of treating tubercular iritis by evacuating the aqueous and injecting air into the anterior chamber, and gave details of three successful cases. Sligeru Morinani published three cases in 1903, and Heath one in 1904.

Haass states that he has used the treatment with the greatest success in six eyes during the last four years.

Case 1. A boy of 16 suffered a lime burn and developed sero-plastic iritis, first in one then in the other eye. Atropine and scopolamine were not tolerated. Mercurial inunction, and subconjunctival saline injections produced no effect. Meantime several "nodules" appeared in the iris. Doses of creosote and the insertion of Wüstemfeld's iodoform leaflets into the anterior chamber were of temporary benefit.

Then he injected air into the anterior chamber, with immediate benefit; a subsequent injection aided the cure, which has been maintained for three years. R.V. improved from fingers at 3 m. to 5_{50} . LV improved from 5_{10} to 5_{5} .

Case 2. A woman of 22 years, of a tuberculous type and family, suffered from a severe irido-cyclitis of one eye, nodules developing in the iris. Scopolamine and dionine had only a temporary effect. Injections of air on two occasions stayed the inflammation and induced a resolution of the process that had remained good for three years. Shortly after the successful injections the præauricular and submaxillary glands had to be operated on.

Case 3. A girl of 17, of tuberculous family, had an attack of irido-cyclitis in one eye. Injection of Koch's tuberculin produced a rise of temperature and a positive reaction in the eye. The dose was repeated, with stronger effects, particularly locally. The air injections were equally successful in this case.

Case 5. A boy of 19, markedly scrofulous, suffered from a parenchymatous keratitis and iritis of one eye of uncertain type. Mercurial inunction was pushed, and scopolamine and dionine used locally, without effect. Air injections were made with success. Later the boy had a tubercular osteomyelitis of the tibia.

Haass describes the method of injecting the air thus: Let the patient lie flat on the back. Cocainize the eye with a 5% solution. Puncture the rim of the cornea with a needle, then insert the fine nozzle of a sterile syringe, in which is placed a little cotton-wool to filter the air. Inject air to half fill the chamber, then slowly suck out the aqueous before withdrawing the nozzle.

The air is usually absorbed in two days, or at most three. The operation may be repeated.

He believes the benefit is comparable to that obtained by laparotomy for tubercular peritonitis. This is quite possible, but whether the benefit depends upon the injection of the air or on the withdrawal of the aqueous seems a little doubtful.

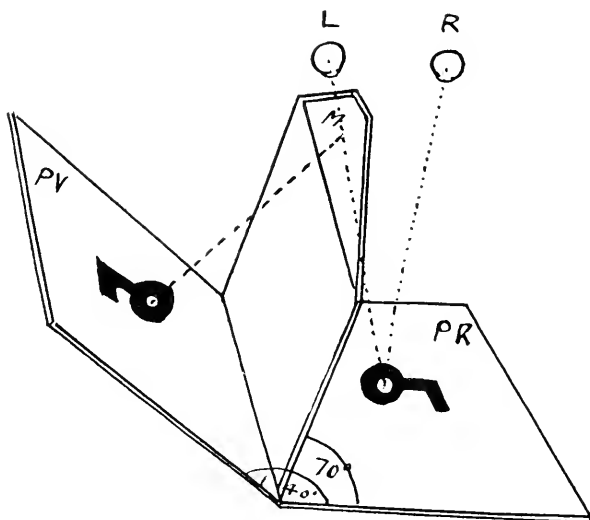
It has been suggested that the stimulation of leucocytosis produced by the disturbance of the operation is sufficient to account for the benefit derived.

N. BISHOP HARMAN.

JOSEPH (Paris). **Researches into and Measurement of Central Scotomata—a new stereoscopic method using the dihedral Stereoscope of Pigeon.** *Archives d'Ophthalmologie*, February, 1908.

JOSEPH, in order to obviate the fixation difficulty met with in mapping a central scotoma makes use of the stereoscopic method, and in particular of the stereoscope of M. Pigeon: this possesses the advantage over Holmes's stereoscope that it is entirely devoid of lenses, which not only produce distortion but limit the field of exploration to about 15° from the fixation point, a limit which is often exceeded by the blind spot itself.

The apparatus is extremely simple. It consists of two planes of wood hinged together so as to open book-wise. They are set at an angle of 140° with each other, and a third plane articulates with the other two at the hinge and makes an angle of 70° with the plane on either side of it. On one side of the central plane (which is fixed and shaped as in the figure), near its upper part, is a small triangular plane mirror. The diagram gives an idea of the apparatus and also shows the course of the rays of light from the charts on the planes to the eyes. Whereas one chart is viewed directly the other is seen through the mirror,



Dihedral stereoscope of M. Pigeon.

and they are so arranged as to be exactly superposable. To use the apparatus it is placed open on a sloping surface of about 40° resting on the external face of the plane PR. On this plane is fixed the chart which is viewed directly by the right eye. Another chart is fixed with inclined plane PV in such a position as to be exactly superposable with the former. Allowance must be made in fixing this chart for the reversal which occurs owing to its being viewed in the mirror. The apparatus is illuminated by a lamp which is so arranged that the chart viewed in the mirror is slightly brighter than the other so as to compensate for loss by reflection. Special charts are supplied with the stereoscope. These are very similar to those used in ordinary perimetry, but they have only the eight principal meridians marked, so as to aid fusion. They may be obtained from J. Cornet, Optician, Paris.

The scotoma is mapped out by the aid of white or coloured spots in the centre of a black index mounted on a handle.

The advantage of this stereoscopic method would seem to be in its extreme simplicity, the inexpensiveness of the instrument, freedom from either lenses or prisms, absence of distortion, the large size of field, the possibility of the patient wearing his ametropic correction, and lastly that it is unnecessary to cover either eye.

J. BURDON-COOPER.

Roche (Marseilles). **A Simple and Rapid Method of Determining the Existence of Binocular Vision.** *Annales d'Oculistique*, January, 1908.

THE ophthalmic surgeon is frequently called upon to determine the presence or absence of binocular stereoscopic vision.

In the estimation of a patient's working capacity after an injury to the eye it often forms one of the essential facts on which compensation is based.

In cases of simulation or unwillingness on the part of the patients it is a great advantage to have a variety of tests at our disposal.

Roche furnishes us with a test which, by its very simplicity, is likely to disarm all suspicion on the part of the patient. It is carried out as follows:—

Take a board 33 centimetres or more in length—an ordinary blotting-pad does very well—and place it horizontally on a level with the patient's eyes with one edge resting on the bridge of his nose. Then at a distance of 25 centimetres from the patient's eyes, place a small pellet of paper or a crumb of bread on the upper surface of the pad, and request the patient to touch it by bringing the point of a pencil or knife vertically down on it. Anyone possessing binocular vision can do this with the greatest ease, but those having only monocular vision will inevitably fail.

As the one-eyed may accidentally succeed once or twice it is well to repeat the experiment several times varying the position of the pellet on the board.

It is easy to detect deliberate deception by the fact that the point of the pencil is then brought down haphazardly on different parts of the board, whereas the genuine one-eyed would always bring it down on a line joining the pellet and the pupil, *i.e.*, the point would always fall in front of or behind the pellet, never to the right or to the left of it.

It is highly improbable that any simulator would prick the board exactly in the visual line of the declared sound eye every time.

We think that a simple reliable test like this, which requires no special appliances and can be quickly applied anywhere, will prove of great service to ophthalmic surgeons.

J. JAMESON EVANS.

E. E. MADDOX (Bournemouth). **The Ocular Muscles.** Philadelphia, U.S.A.: Keystone Publishing Co. 2nd edition. 1907.

THIS second edition maintains the high reputation of the author as an original investigator and thinker in an important department of ophthalmic work; Dr. Maddox has laid ophthalmic surgeons under a debt of gratitude to him. The volume under consideration is a credit to its author and to British Ophthalmology. The first chapter is devoted to the consideration of the eye-ball and the socket which it occupies. A careful account is given of each of the muscles, of the directions in which they move the eye-ball and the methods in which their actions are controlled by check ligaments. As was to be expected, Dr. Maddox quotes very extensively from Motais. The chapter is perhaps not so full as in the recent work of Howe, but it is perfectly sufficient for all practical purposes and leaves nothing to be desired. The chapter on ocular motions is particularly good, it deals clearly and succinctly with the law of Donders and with that of Listing. A very interesting section in this chapter is the author's proof of the substantial agreement between Helmholtz and Donders regarding the laws of false torsion. It seems to us that Dr. Maddox has proved his case conclusively that these two authorities instead of being in direct opposition to each other are in substantial agreement. In this chapter we find a description of the author's torsion calculator. He seems to have a great facility in inventing pieces of apparatus which are essentially simple but are always useful and show great ingenuity.

The chapter on strabismus is particularly good. How very different the subject is now from what it was in the old days before this condition had received scientific treatment.

We are glad to observe that he makes abundant mention of the excellent work by Claud Worth in the training of the fusion centres. We have always regarded Mr. Worth's book as one of the best practical treatises on squint and one which is quite as good as any other as yet published, either in English or in any other language, and so long as the British Ophthalmic School has men of the stamp of Maddox or of Worth, it will more than hold its own on the scientific side of ophthalmology with authors in other countries. A new feature in the second edition is a chapter on Nystagmus. This is a subject which is

often in the ordinary text-books slurred over, but it receives fairly adequate treatment in the present work.

The various forms of heterophoria are fully dealt with and include the rules applicable to the decentration of lenses. We do not altogether like tangent scales divided in centimeters for the word tangent seems to us to imply a definite function of an angle the increase of which is not a constant. All the same the author's scale is of great practical utility, and the use of it does not involve any serious error in competent hands. Indeed it has this advantage that the patient does not require to be at a definite distance from the scale, for, given the distance along the scale and the distance of the eye from the scale, it is a matter of easy calculation to determine the angle. Altogether the text-book is one which we have much pleasure in cordially recommending to ophthalmic surgeons, and to students of ophthalmology.

THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Thursday, May 7th, 1907.

MR. MARCUS GUNN, *the President, in the chair.*

CARD SPECIMENS.

Microscopical Sections from the case of Orbital Growth exhibited at the last Meeting.—Mr. E. E. Henderson.

The tumour was removed through an incision in the outer third of the line of the eyebrow; it consisted of five more or less separate nodules encapsuled and joined together by a fibrous sheath, and lay between the skin and tarsal plate. The microscopical section showed the growth to be a round-celled sarcoma.

Lantern for Testing Colour Perception.—Dr. Edridge-Green.

A cheaper form of Dr. Edridge-Green's well-known testing apparatus.

A Portable Illuminative Attachment for the Ophthalmoscope.—Dr. Clement Hailes.

In a short tube, attached at an angle of 45° to the front of the ophthalmoscope, is contained a small 2-volt Osram lamp, whose rays fall on the obliquely-placed mirror of the ophthalmoscope, and are reflected into the patient's eye. The current is supplied by a single small accumulator cell.

Nernst-lamp Projecting Lantern for Consulting-room use.—Mr. J. H. Tomlinson.

Calcareous Scar on the Cornea.—Mr. M. L. Hepburn.

A man, aged 54, showed a diagonally-placed band, about 2mm. broad, superficial and sharply defined, on the central part of the cornea. Although there was no history of foreign body or blow, it was probably a calcareous change taking place in a scar. It did not interfere much with vision.

Aniridia in both Eyes.—Mr. W. H. Jessop.

A female child, 8 years old. In addition to the aniridia there was a lamellar cataract in the left eye, and a dense congenital one in the right, with posterior polar opacity in both.

Glioma of the Retina in the right eye of a boy aged 9½ years.—Mr. W. H. Jessop.

This was a child who attended St. Bartholomew's Hospital suffering with what appeared to be a typical glioma of the retina; the point of special interest in the case was the age of the patient.

PAPERS.

Ptosis Operations.—Dr. Freeland Fergus.

The general lines of operative procedure adopted for the relief of this condition were discussed under four headings:—

1. Production of cicatricial contraction by means of irritation caused by sutures.
2. The use of ligatures of various materials—metal, thread, etc.—which are left in.
3. Advancement of either the occipito-frontalis or levator palpebræ muscles.
4. Plastic operations.

Dr. Fergus had obtained good results by advancement of the occipito-frontalis muscle, in doing which he was careful to make a large incision along the eyebrow, thus securing a broad attachment of muscular tissue to the edge of the lid.

The operation, as he now usually performed it, consisted in the removal of an elliptical area of tissue from the upper lid, slightly above its free margin, including all the structures down to the conjunctiva; in his later cases he had even found it advantageous to include this latter membrane also. Through the broad incision above referred to, he advanced the occipito-frontalis muscle and attached it to the edge of the lid by means of a deep set of 3 catgut sutures, subsequently closing the skin

by a superficial set. Good voluntary opening of the eye was obtained by this operation, and although the lids did not completely close during sleep, Dr. Fergus stated that he had never yet observed any trouble arising from this cause.

Tubercle of the Choroid treated by Tuberculin.—Mr. Ernest Clarke and Sir Almroth Wright.

A healthy boy, aged 14, after playing cricket in the sun, noticed blurring of sight in the left eye. The vision was $\frac{6}{12}$ (2 letters), and in the fundus between the disc and the macula was a large oval prominence about a disc diameter broad, and raised to the extent of 3D. The retina in the neighbourhood was œdematous, and in parts covered by exudate. No enlargement of any lymphatic glands could be felt. Five days later the condition was much worse, the vision was reduced to $\frac{6}{18}$, there was K.P., and the œdema in the fundus had considerably extended.

Treatment by tuberculin injection, controlled by the opsonic index taken from time to time, was then commenced by Sir Almroth Wright. In all, 21 injections were administered, and the opsonic index, which at the beginning was as low as 0.66, rose to 1.15 after a year's treatment, while all the signs of inflammation completely cleared up, and the vision improved to $\frac{6}{9}$. In conjunction with the tuberculin treatment, inunction of oleate of mercury 10 per cent., followed by iodide of potassium, was used during the first 9 months.

Tubercle of the Iris treated by Tuberculin.—By Mr. Ernest Clarke and Mr. Mayou.

G.W., aged 3, attended the Central London Ophthalmic Hospital, under Mr. Clarke, with a history of the right eye having been inflamed 3 months.

The right iris showed a group of nodules at the lower margin, with many new vessels on the surface; and some K.P. was present. In 3 days these spots of K.P. had considerably increased, and the opsonic index gave a reading of 0.45; $\frac{1}{1000}$ milligram of T.R. was injected, and in a little over a fortnight the index had risen to 1. During the next 2 or 3 months $\frac{1}{1000}$ milligram was administered every 2 or 3 weeks, at the end of which time the index stood at 1.15. The child was admitted again 7 months later for the application of Calmette's test, which gave a slight positive reaction; and after 9 months' treatment altogether all the nodules had disappeared; there were, however, some synechiæ, and the lens became opaque.

No signs of tubercle were found in the chest, but the submaxillary and cervical glands were enlarged.

A case of Arterio-venous Aneurism treated by Ligature of the Common Carotid.—Dr. George Mackay.

This case was shown at the meeting of the Society held in May 1907, at Edinburgh, as a traumatic arterio-venous aneurism of the right orbit, with pulsating exophthalmos. Ligature of the angular vein had been advised, but Mr. Cotterill preferred to tie the common carotid, which operation was performed on June 18th, 1907, with the result that all the symptoms quickly subsided, and the patient was quite well when last heard of. The vision, which had formerly been finger counting at $3\frac{1}{2}$ metres, had improved to $\frac{6}{18}$.

A case of Phlyctenular Keratitis and Pustular Episcleritis treated by Staphylococci Injections.—Dr. George Mackay.

Miss E.J.W. consulted Dr. Mackay in October 1898, when a small pustule was found on the conjunctiva near the inner and lower border of the cornea. This gradually improved under ordinary treatment, and 1 month later the vision in the right eye was $\frac{6}{9}$ with correction, while that of the left was $\frac{6}{21}$ pt. She remained well for 3 years, but in March 1901 a small patch of conjunctival injection appeared at the outer side of the right eye, near the limbus, with some haziness of the adjacent cornea. This cleared up with the same treatment as before, but from this time there were constant relapses in one part after another, during the next 6 years, the longest respite being 12 months. Finally, these phlyctenular elevations developed into larger yellowish nodules with some ulceration of the surface. Tubercle was then strongly suspected, and with this diagnosis in view, on March 5th, 1907, Dr. Ian Stewart ascertained the opsonic index which, for tubercle, was found to be 0.74 and for staphylococcus aureus 1.24. A smear taken from the conjunctival sac revealed many polymorphonuclear leucocytes, no tubercle bacilli, but some staphylococci. Although, on the whole, the indications were not in favour of tubercle, an injection was given, but this being followed by a positive instead of a negative phase, the idea of the affection being of a tubercular nature was definitely rejected. The treatment next adopted was the injection of $\frac{1}{500}$ milligram dried staphylococci dissolved in 1 cc. of distilled water, which was followed by a negative phase, but in 24 hours the opsonic index had risen to 1.86. After about 7 injections the nodules had completely disappeared, and there had been no recurrence until January 24th, 1908, when it took a much milder form, being merely of the nature of a slight congestion at the upper and outer part of the limbus. It was, however, thought advisable to give an injection occasionally as a prophylactic; and Dr. Mackay considered it necessary to continue the treatment periodically, even after all signs of inflammatory reaction had disappeared.

MALCOLM L. HEPBURN.

A CASE OF PARTIAL PTOSIS WITH EXAGGERATED INVOLUNTARY MOVEMENT OF THE AFFECTED EYELID: THE "JAW-WINKING" PHENOMENON.

By WILLIAM GEORGE SYM, M.D.

THE features of this case are these: A. J., a young woman of 30, came to me from the North of England complaining of two things, namely partial ptosis on the left side, and secondly (and from her point of view more importantly) that at times the left upper lid executed involuntary and "ridiculous" movements. On examination I came to the conclusion that the only fault to be found with either eye was that which is well illustrated in the two accompanying figures (Pl. 19, figs. 1, 2). There was a very distinct degree of ptosis of the left upper eyelid, the levator of which, however, was by no means paralysed, for within limits it enjoyed ready and free movements. Movements of the globe were perfect; there was not a trace of halting or failure to look upwards or in any desired direction. When, however, the patient was chewing her food or when she was singing, the left upper lid, as one might almost say, sprang upwards, disclosing perhaps as much as 3 mm. of white sclerotic above the corneo-scleral junction. It was this really which had distressed the patient so much, for she could not take food in the presence of strangers without remarks being made upon the curious appearance of her eye, nor could she, though very fond of music, sing before others, for the same reason. I exhibited the patient to my colleague, Dr. Alexander Bruce, as an example of what has been—very inelegantly—called the jaw-winking phenomenon, and together we investigated the case further.

There was very distinct elevation of the eyelid on use of the left external pterygoid muscle (moving the jaw to

the right), but it was merely a partial lift, a sort of exaggerated twittering of the eyelid up and down; when, however, she suddenly opened her mouth by actively depressing the lower jaw, the lid sprang up in the manner shown in the second photograph. There was at the same time no exophthalmos or any alteration of the pupil; vision was good and equal. When the lid flew up there was no corresponding movement of the right upper lid, there was no corrugation of the forehead, nor was there any untoward movement of the eye itself, whether lateral, vertical, rotatory, or antero-posterior. Nor was there any evidence which might point to any affection of the sympathetic on one side, such as unilateral sweating or flushing. The condition had been present all the patient's life; she could not say there was any change in this respect since childhood. She had no sensation of anything happening; it was the obvious, unpleasing, facial contortion which had brought her to me, nothing else.

The first case of the kind was described by Marcus Gunn in 1883, and since then some twenty to thirty cases have been noticed. Mr. Gunn showed his patient at a meeting of the Ophthalmological Society, a committee of the members of which afterwards reported upon the case. His patient was a girl who presented symptoms very similar to those of A. J., only that the involuntary elevation of the eyelid came on with lateral movement rather than with vertical opening of the mouth. The committee which investigated the case came to the conclusion that probably the levator was innervated partly from the nucleus of the third nerve and partly from the external pterygoid portion of the nucleus of the fifth nerve, and that there was an abnormal connection between the two. If some of the innervation of the lid, innervation which is evidently defective, arose from the fifth nucleus, that would account for the appearances.

Much the most important paper written on this subject will be found to be that of Sinclair of Ipswich, who in



Fig. 1.

A. J. The aspect at rest.



Fig. 2.

1895 collected a number of cases of associated movement, and reviewed them in the *Ophthalmic Review* for October of that year. These he divides into three series, of which the first consists of those in which certain movements of the lower jaw are associated with an upward movement of the eyelid; the other two series do not concern us at present: they are of quite a different type. Our present case would fall to be included in his first group under Series I., for that comprises the cases in which either lateral movement or wide opening of the mouth brings on the elevation of the eyebrow. The second group takes in the cases in which depression of the lower jaw alone brings on the elevation; in the third group are those cases in which lateral movements of the jaw alone, as in the process of chewing, set up the contraction, though vertical movements do not. In some few of the cases the untoward movement only took place when the eye was also looking down: that was not true of the present case. It is a curious fact that out of twenty-five cases in which the point is noted, the error was on the right side only in seven; in all the others it was left-sided. Although ptosis was present in nearly all, the associated movement was noticed in a very few without any ptosis existing. The observation has often been made that if one endeavours to induce a child to open the eyes widely he is very apt to open his mouth instead or in addition, and all the more so should there be any blepharospasm at the time. Ole Bull and others consider that such a movement is simply reflex, and that the special form we are discussing is analogous to it. But Sinclair is perfectly correct when he points out several objections to such an idea, particularly that in some cases it is on lateral movements of the jaw only that the symptom occurs, that the symptom is one-sided only, and that in the children spoken of the attempt to elevate the lid is carried on by the frontalis muscle, and the facial aspect is therefore entirely different. The explanation offered by the committee on Gunn's case

is much more satisfactory, namely, that the levator receives nerve impulses both from III. and V. nerves. Helfreich has suggested that the abnormal fibres might perhaps come from the facial. In a certain number of the cases it may be true, as suggested by some, that there may be imperfect development of the oculo-motor nucleus; but, as we have just mentioned, ptosis is not invariably present.

A singular paper on the subject has been written by Harman, who endeavours to explain the association of lid-movement along with jaw-movement, "not as a 'freak,' but as a revival of an old-time and long-accustomed associated movement." He traces the facial musculature back to our ancestors the fishes, where it forms the spiracular musculature, the pterygoid muscle of man being the lineal descendant of the deep gill-muscle which moves the maxillary cartilage. He considers that as the eye, in the process of development, became a more mobile organ than primitively it was, it filched from the spiracle its muscular apparatus, and thus in man a case will now and then turn up in which this atavistic association between jaw on the one hand and spiracle-modified-into-mobile-eye on the other is manifested. His conclusions are not, it must be confessed, very convincing.

To sum up, there does not appear to be any other probable explanation of this curious association than that in some inexplicable way there arises some confusion in the joining up of fibres and cells belonging to the fifth and third nuclei in such fashion that the levator receives less than its normal innervation, and there is therefore a certain degree of ptosis (though this is not a necessary part of the error), but there is no paralysis of the muscle, which is capable of full contraction: at the same time, the levator receives some fibres which were "intended for" the external pterygoid or the digastric, and when that muscle is put in action, at all events when put strongly in action, the levator is unintentionally innervated, producing the curious effect described. When examining the

present case along with me, Dr. Bruce put forward tentatively the suggestion that the elevation of the lid might be caused by undue contraction of the unstriated muscle of the lid, and it must be admitted that the appearance of the eye is not unlike the familiar aspect in exophthalmic goitre; but I think myself that the contraction is too sudden and swift to be due to the unstriated muscle, and the unusual nature of the aspect is due to the fact that we never see the levator act under normal conditions without the elevator muscles of the globe also. Thus we never see that gap of sclerotic between the upper limit of the cornea and the edge of the upper lid which is so well brought out in the photograph as occurring in this patient. We should take along with this case, too, those others in which *other* muscles supplied by the third nerve have had their innervation mixed up with that of the jaw muscles, causing the globe to take up an abnormal position or the pupil to contract.

Since 1895, when Sinclair analysed the cases published up to then, I am aware of two other examples, those of Fischer and Harman, shown to the Ophthalmological Society in 1899 and 1903. The matter receives recognition in very little of the recently published literature dealing with the eye and the nervous system.

I have to thank the Editor of the *Review of Neurology and Psychiatry* for the loan of the block of the excellent photographs of the patient which he had taken.

FOREIGN BODIES IN THE ORBIT.

By N. C. RIDLEY, M.B. (Lond.), F.R.C.S.,
Ophthalmic Surgeon to the Leicester Infirmary.

THAT the diagnosis of foreign bodies in the orbit, even of considerable size, is not unattended with difficulty at times, is illustrated by the following two cases.

S. P., a groom, æt 39, while carrying a scuttle of coal in the dark, tripped and fell on to a standard rose tree. He went to his own medical man, who found a wound of the left upper lid just above the inner canthus, and applied an ordinary antiseptic dressing. It did not heal but continued to swell, until the globe was thrust outwards and forwards to a very great extent. One or two small fragments of wood came away on the dressing.

In June, 1907, five weeks after the accident, he was sent to me because of the ocular displacement. There was a small discharging fistula at the site of the wound. On passing a probe a hard substance, which could not be the bony wall of the orbit, was felt. The opening was enlarged and a piece of dead wood covered with bark, measuring one inch by half an inch and about a quarter of an inch thick, was removed with sinus forceps. The wound, which was two and a half inches deep, took a long time to heal, and owing to the induration it was a month or two before the normal position of the eye was restored. The vision was not damaged nor were the normal movements seriously interfered with.

W. B., a clerk, æt 48, gave the following history. On May 18th, 1908, he was riding downhill on a bicycle late at night, when he lost control and was thrown against the bank by the roadside. He did not lose consciousness. He went to a doctor who stitched up a wound of the brow, and he then walked five miles home to Leicester. On the following day he was sent to me with his face much cut

about and the left eye extremely proptosed and the lids so tight and swollen that they could not be separated. The intra-ocular tension, which could not be definitely felt, seemed normal. There was no oozing of blood nor other fluid. He was admitted as an in-patient at the Leicester Infirmary, as I thought he had fractured the base of the skull and injured the cavernous sinus, causing great intra-orbital hæmorrhage; but that, seeing there was no pulsation nor thrill, the ophthalmic artery had escaped. Cold applications and a leech were used and on the next day the lids could be opened a very little, when the cornea and iris looked bright and the patient said he could see with that eye.

Nine days later the lids could be separated still more and a wound of the conjunctiva on the inner side of the globe was visible. Near this was a small, dark rounded body about the size of a pea which looked like blood clot. Examination of this with a probe proved it to be a foreign body, and when this was seized with forceps, a piece of wood one and a half inches long by two inches in circumference was removed. It had the appearance of being recently broken green wood, was nearly entirely covered with bark and lying in the orbit with it was a hawthorn leaf.

The swelling has since almost disappeared and with the exception of some outward displacement of the globe, which will probably disappear in time, the man seems to be well, the vision as in the other case not being interfered with nor the movements much limited.

Had the man been thrown into a hedge, some suspicion of a foreign body might have been entertained, but, according to his account, he fell on a grassy bank and on the road. No one was more astonished than the patient when the piece of wood was extracted. There was no wound of the eyelids near the point of entry, so no doubt the eye was open at the time.

It is wonderful how the free mobility of the globe in Tenon's capsule protects it from injury in cases such as these.

Postscript. Since the above was written, the swelling has entirely subsided and the wound, which appeared to have been caused by a blow on the brow, is seen to be situated below it. It was a long horizontal cut and, owing to the swelling, lay just over the brow: and as it was already sutured and looked clean, I did not thoroughly examine it. From the deep adhesion of the scar now that it is healed, I have a suspicion that it was here the foreign body entered, although the latter was afterwards removed through the palpebral aperture and seemed to have no connection with the eyelids at all.

REVIEWS.

W. G. M. BYERS (Montreal). **A Study of the Ocular Manifestations of Systemic Gonorrhœa.** *Studies from the Royal Hospital, Montreal.* Vol. 2. No. 2. February, 1908.

THIS monograph contains the record of a very exhaustive study of the ocular manifestations of systematic gonorrhœa, and bears ample evidence of the care and judgment bestowed upon its preparation. The bibliography includes reference to all important writings on the subject since 1800: and reports of a large number of selected cases are given, exemplifying the varied lesions induced by systemic infection.

Beginning with a brief historical chapter, followed by one entitled "General Considerations," the subject is dealt with in seven sections, under the headings "Affections of the Conjunctiva, Cornea, Sclera, Uveal Tract, Optic Nerve and Retina, Tenon's Capsule, Lacrimal Gland."

All these chapters are clearly written and of much value; that on Affections of the Uveal Tract being perhaps the most interesting as it is the most extensive. It includes the report of a case under the author's care, in which death ensued from severe systemic infection, and the eyeball, affected by iridocyclitis, was obtained for microscopic examination. By analytical examination of cases Byers shows conclusively that

affections of the uveal tract may occur without antecedent or coincident gonorrhœal arthritis. The authors of some well-known text-books still maintain that gonorrhœal iritis is always preceded by arthritis. In this connection may we express our regret that so careful a writer as Byers has not rigorously excluded the term "gonorrhœal rheumatism" from his treatise.

As a concluding chapter to his excellent monograph, the author gives "Conclusions and Principal Points of the Study," and gives them so well that we abstract the following statements from them:—

I. relates to history.

II. *Systemic* gonorrhœa most commonly occurs in males, but nothing definite is known as to the factors which underlie the undoubted predisposition of certain individuals to this form of the disease. Pathological evidence seems to show that the gonococci themselves and not their free toxins, or the secondary or mixed infections, are responsible for the local manifestations. Metastatic inflammations of the eye, of gonorrhœal origin, are marked, in general, by uncertainty and irregularity as regards their time of occurrence, the severity of their symptoms and their course and behaviour; by their close association with metastases of like origin in other parts; and by a marked tendency to relapse and to recur. Ocular inflammations are often the first manifestation of systemic gonorrhœa, and there is reason to believe they are sometimes the sole expression of this condition.

III. Metastatic gonorrhœal conjunctivitis is a well-established clinical entity. It occurs at any time during systemic gonorrhœa, and usually involves both eyes simultaneously. In 30 per cent. of the cases the inflammation is complicated by affections of other coats of the eye.

IV. The keratitis which occurs in association with systemic gonorrhœa is of a multiple and superficial character and commonly symmetrical, and central in situation.

V. Cases of sclero-conjunctivitis ought to be differentiated from metastatic conjunctivitis and classed by themselves.

VI. In every case of gonorrhœal iritis the pathological process is not limited to the iris. It is probably advisable to discard the term iritis for that of irido-cyclitis.

VII. Metastatic gonorrhœal affections of the uveal tract show a tendency to be bilateral in the first, as compared with second and later attacks, and to relapse and to recur with

fresh gonorrhœas. They precede, follow or accompany other manifestations, or form the sole expression of the systemic infection; but they are marked by no special features except that swellings of any kind in the iris tissue are never observed. Gelatinous exudations are more indicative of the severity than of the origin of the inflammation.

VIII. The metastatic gonorrhœal inflammations of the optic nerve and retina commonly take the form of a diffuse neuro-retinitis, associated at times with considerable retinal œdema. Pathological evidence favours the blood-vessels rather than the lymph spaces as the principal route for infection.

IX. The cases of dacryo-adenitis, which have been attributed to systemic gonorrhœal infection, conform to what is known of inflammation of the lacrimal gland in general, viz., that while cases caused by direct extension are generally unilateral and go on to suppuration, those produced by metastasis are usually bilateral and end in resolution. J. B. L.

N. M. SEMPLE. **The Pathology of the Retina in Bright's Disease.** *American Journal of Ophthalmology.* March, 1908.

THIS article contains the observations made by Semple upon the eyes of three cases of Bright's disease. The cases had been studied during life and the retinæ were obtained for microscopic examination after death. In case 1, the neuro-retinitis was associated with changes in the kidney of an acute parenchymatous type; in cases 2 and 3 with chronic interstitial nephritis. Semple's study of the microscopical appearances in the retina of the three cases has led him "to conclusions corresponding in many respects to those found in the literature on the subject and now generally accepted, yet also to other conclusions which differ from any he has been able to find."

The pathology of the retina as shown by the sections of all three cases, presents a definite uniform picture. The changes are chiefly in the outer reticular layer, but also, in a lesser degree, in the inner nuclear, ganglion-cell and nerve fibre layers, and, corresponding to the ophthalmoscopic observations, are confined almost entirely to the region of the macula and optic disc. The changes in the outer reticular layer are (1) cyst-like spaces, so often described, either without visible contents or filled by an almost transparent finely fibrinous fluid; (2) irregular masses of deposit, often involving the entire

thickness of the layer and sometimes extending through the outer nuclear layer as far as the external limiting membrane. Semple's views concerning the nature and origin of these masses differ somewhat from those hitherto expressed by Leber, Karl Theodore, Haab, v. Michael, and others. His conclusions are based upon prolonged examination of his specimens by many different methods of staining, the details of which must be omitted in this notice. According to his views the masses of exudation are found in three forms, which represent different stages in a process of transformation of fibrinous exudation into hyaline material. In the first stage the mass of deposit in the retina presents a characteristic fibrillar net-like appearance, giving by means of Weigert's stain a true picture of fibrin. In a later stage the reaction to this stain becomes less marked, and the masses become more homogenous, glistening and strongly refractive, and give the staining and other reactions indicative of "Hyaline."

Semple also gives a careful account of his investigations of certain appearances usually found in cases of albuminuric retinitis which have been considered as varicosities of the axis-cylinder processes in the nerve-fibre layer, since Mueller's original description. He states that these bodies (the varicosities) in their reaction to various aniline stains exhibit a remarkable resemblance to the exudation found in the outer reticular layer, and although they show the characteristic form of ganglion cells (as first described by Heymann and Zenker) their reaction to stains is not that of cell substance or of nuclei. The author considers that these bodies are, without doubt, masses of degenerated ganglion cells which have been forced from their normal position in the ganglion layer, in to the nerve-fibre layer, often as far as the internal limiting membrane. In no instance could fat be demonstrated in the ganglion cells. His opinion is therefore antagonistic to that first enunciated by Mueller and since generally accepted by writers on the subject.*

Semple's paper is the record of an exhaustive examination of specimens, in which great care was taken in the preservation of the tissues obtained *immediately* after death, and is worthy of study by those interested in the pathology of albuminuric retinitis.

J. B. L.

* See Parsons' "Pathology of the Eye." Vol. II.

THORNER (Berlin). **On the Connection between Near Work and Short-sightedness.** *Klinische Monatsblätter für Augenheilkunde*, January, 1908.

THAT the use of the eyes in near work produces short-sight is a proposition which will hardly be disputed. But as to the precise manner in which the effect follows from the cause, and as to what are the most important factors among the varied assemblage of actions which are included under the term near work there is by no means the same unanimity. Three or four theories at least have been advanced.

Of that which attributes the alteration in shape to the pull of a congenitally short optic nerve on the posterior pole of the eyeball little need be said, for there is no anatomical evidence to support it.

More plausible is the theory which attributes an important rôle to the muscles of accommodation, for these muscles come into action precisely under those circumstances which produce short-sight. But the difficulty of finding any connecting link between the activity of these muscles and the actual lesion of myopia has been insuperable. The increased tension of the globe which was supposed to result from the contraction of the ciliary muscles proved non-existent: nor could the traction of the meridional fibres on the anterior part of the choroid be shown to have any appreciable influence in causing bulging of the posterior pole of the eye. Further, if the ciliary muscle were the efficient cause of the myopia the latter should always become stationary when it reached 3 or 4 D, for after that the ciliary muscle is no longer brought into action. Moreover, and this is perhaps the most cogent argument, clinical experience has amply shown that the use of glasses in near work which call out the full physiological activity of the ciliary muscles, so far from favouring the increase of myopia, is, on the contrary, one of our most trustworthy aids in restraining it.

Thorner also finds difficulties in the theories which associate the production of myopia with the action of the external ocular muscles. To that which regards convergence as the essential agent in the matter he objects that myopia occurs in persons who have only one functional eye, that it is not more common in persons affected with convergent strabismus, and, finally, that it has not been definitely shown that there is more

pressure exercised by the muscles during convergence than in lateral movements with the visual axes parallel.

As regards the view which assigns a particularly harmful influence to the superior oblique muscle, especially when, owing to lowness of the orbit, its tendon is closely applied to the eyeball, he remarks that the statistical evidence as to the concurrence of low orbits with myopia is conflicting, and that in persons who read or write with bent head the eyeballs may be actually directed upwards, and yet under such conditions myopia is particularly apt to occur.

Thorner has consequently set himself to examine afresh the movements of the eyes in near work. Several previous observers have attempted to do so, *e.g.*, Landolt, who caused the patient to read lines of print pasted on a glass plate, through which he could observe the eyes; but the extreme minuteness of the motions renders such observations difficult; and Thorner has therefore adopted the following plan.

The person whose eyes are to be observed sits at a table looking straight forward. Before his right eye is placed a prism whose angles are 30° , 60° and 90° . In this he sees, by double reflection, the objects on the table in their natural (unreversed) position. He can thus read, write or carry on other work in a natural manner. At the same time, the fundus of the left eye can be examined by the ophthalmoscope, whereby its movements will be seen under a magnification of 16.

Observed in this manner the movements of the eye can at once be distinguished as being of two kinds—the *continuous* and the *discontinuous*. The continuous are slow, gliding movements, the discontinuous are short jerks. Now the jerky movements are obviously those which are most likely to tax the resistance of the sclera, just as a machine whose motion is of a rapid to and fro character wears out sooner than one whose motion is rotatory and continuous. "The globe being in rapid movement and suddenly checked, the individual parts of the sclera tend to continue moving each in a tangential direction. The whole portion of sclera therefore which lies behind the insertion of the muscles must, through its internal cohesion, experience this stress. The optic nerve also, lying in loose tissue, will tend to continue the motion, and here, at the attachment of the nerve to the globe, that is, at the papilla, will its movement be brought to a standstill." Though each individual jerk is small, by summation their effect becomes

considerable. The question then is, whether in near work these jerking movements of the eyes so far preponderate over the continuous ones that they may be regarded as a factor of importance in the production of myopia.

Thorner points out, firstly, that the ordinary movements of the eyes as we direct them from one object to another are not of a continuous character, but are made up of a series of short jerks. The eyes are capable of making continuous movements, but only under two conditions—namely, when we keep the eye fixed on an object and move the body (*e.g.*, turn the head), and when the eye follows the movement of a gliding object. This may be demonstrated by the apparatus before described; if the person be asked to carry his eye along a certain line the movements of the other eye will be found to be a series of short jerks, while if an object be moved along the same line while he is asked to follow it the movement of the eye at once becomes a continuous one.

It appears, however, that in our ordinary movings from place to place the number of jerks of the eyes is reduced to a minimum, for each object as we approach it is fixed for some seconds before we transfer the gaze to the next, or with a moving object the movement is followed for an appreciable time before it is abandoned.

The conditions are quite otherwise in reading: here the movements are entirely of the discontinuous character. (It is indeed quite impossible to read print by a continuous movement of the eye: this is easily demonstrated by moving the point of a pencil evenly along a line of print and keeping the eye fixed on it: not a word of the line will be recognised.) The jerks, moreover, follow each other in rapid succession, for with a practised reader about seven occur in every second, or 25,000 in an hour's reading.

In writing the movements are slower, not more than one-fifth of the rate of those of reading, and the eye does not, in a practised writer, follow the movements of the pen up and down but pursues a horizontal course along the lines.

In occupations such as sewing, embroidery, crochet and the like Thorner finds that the movements, unlike those of reading and writing, are mostly of the continuous character, either a single point being kept fixed, or the movements of the hand being followed. These facts appear to be in agreement with the observations of Cohn and others who found that the workers at fine and close occupations other than reading and

writing, such as in goldsmiths, watchmakers and jewellers, do not in general become myopic.

Thorner points out that each individual acquires a certain rate of reading which becomes habitual to him and which does not vary whether he hold the book nearer or further from his eyes. Since the same number of letters (about six) is embraced by each movement of the eye, if the print be held at a greater distance each movement of the eye has a smaller angular amount and the momentum acquired is correspondingly less. This, according to the author's theory, is the real reason of the importance of keeping a sufficient working distance in reading and writing. By similar reasoning it would appear inadvisable unduly to increase the size of the print, as the individual jerks would be increased in angular extent.

Thorner notes incidentally that his theory affords an explanation of the fact that the two eyes do not suffer to an absolutely equal extent from myopia, but that it is generally somewhat greater in the right: the movements of the eyes being always towards the right, in the left eye the tendency will be, when the jerk is stopped by the optic nerve, to exercise a drag towards, in the right away from, the macula. There should also be a tendency to a difference in the form of the staphyloma in the right and left eye, but observations on this point are wanting.

It cannot be said that our views on the causation of myopia are yet sufficiently definite to allow us to neglect any theory which appears to have a foundation in fact. And if Thorner's observations and deductions do not solve the whole problem of myopia, they may be worth keeping in mind as suggesting one point of view from which to regard it.

W. G. L.

C. SCHULIN (Billings, Montana, U.S.A.). **The Real Cause of Myopia.** *Annals of Ophthalmology*, April, 1907.

A VERY curious article appears under this heading, the precise bearing of which is not very readily to be comprehended: the chief point appears to be that we are wrong in supposing the chief, or a chief, cause of myopia to be working the eyes in youth for too long hours or against any strain. The author starts with the discussion of Cohn's statistics, which, as everybody knows, show that as the age of a schoolboy increases

so does his "average" liability to myopia. The idea that poor illumination of school-rooms is to any extent responsible for this is opposed by Schulin on the strength of the observations of Just and Risby, who show that the proportion of myopes is similar whether the scholars are working in modern, well-illuminated, hygienically furnished rooms, or in ill-lighted and unhygienic apartments. Schulin complains that all the theories as to the cause of myopia deal with the mechanical side of the process. "No one," he says, "ever seems to have thought that the general health of the child might act a part." His reading, we fear, cannot have been very extensive if he has not come upon the suggestion that the health of the patient has a very important bearing on the matter.

In a little résumé of the different varieties of errors of refraction he goes out of his way to explain the derivation of myopia as being that state in which a person has the horizon only of a mouse! (That is on a par with the statement propounded in a certain manual of ophthalmology that *muscae volitantes* were so called from their resemblance to *running mice*!) He shows, a few lines further on, that he has entirely misunderstood the meaning of a passage in Donders's *opus magnum*, and pours out vials of contempt upon that savant as the result of his own error.

The standard of $\frac{20}{20}$ he thinks is too low; it should be $\frac{20}{15}$. We are told that 4 per cent. of the inhabitants of Montana enjoy $\frac{20}{10}$.

Apparently Schulin's theory is that myopia is chiefly due to the absence or insufficiency of the "therapeutic" action of spermin. It is to the action of this substance, according to him, that the eyes are indebted for the removal or disintegration of waste products. During sleep the eyes are turned upwards and inwards from catatonic contraction of certain muscles; if sleep is disturbed by some indisposition and if then in an imperfectly darkened sleeping-room the attention of the eyes is attracted by a small illuminated object, and particularly if only one eye is so attracted, the eyes, prevented from free movement by the attachment of the optic nerve, may have their shape altered, especially during childhood when the sclero-corneal coat is soft and flexible. An important cause of myopia therefore, according to our author, is the imperfect darkening of sleeping-rooms. The "missing link" is supplied by scrofulosis. Amid much verbiage and peculiar phraseology Mr. Schulin's theory appears to be that this con-

dition prevents the due formation of spermin, waste products are imperfectly removed (*e.g.*, from ocular muscles and tissues), while a crack in the shutter keeps these muscles, etc., in a state of undue activity at night, with resulting weakening of tissue, and myopia. His chain of reasoning is weak, and his conclusions unconvincing.

W. G. S.

TSCHIRKOWSKY. The Action of Toxins on the Conjunctiva.
Archiv für Ophthalmologie, lxxviii.

THE study of the individual bacteriological forms of conjunctivitis is greatly impeded by the fact that the organisms which give rise to conjunctivitis in man are not pathogenic for animals, or do not cause a conjunctivitis when their cultures are introduced into the conjunctival sac.

This difficulty has been met by many observers, and has generally been overcome, in part at least, by protracted instillation of the toxins of the organisms into the sac of the experimental animal. A certain amount of divergence in the recorded results induced Tschirkowsky, working in Axenfeld's laboratory, to repeat the previous experiments under very exact control, and to carry the investigation somewhat further than had been previously done.

With diphtheria toxin a diphtheritic inflammation of the conjunctiva could always be obtained in susceptible animals, when the toxin was sufficiently concentrated; the instillation must be continued for at least 4-6 hours, and the inflammation began in twenty-four hours after the instillations were commenced. The reaction did not occur in artificially immunised animals, and the controls definitely proved that the reaction was a specific one. Corneal complications were observed in cases where there was no secondary infection with organisms capable of producing keratitis.

A series of tests were made to determine the reaction of the conjunctiva to the toxin of the gonococcus: the previous results were contradictory, Morax and Elmassian had recorded positive results, and Randolph negative. Tschirkowsky explains this by variation in the virulence of the gonococcus strain used. Working with virulent strains and unfiltered cultures, he always obtained a severe, though transient, conjunctivitis, in the discharge from which only the usual conjunctival inhabitants in their usual numbers were present.

In one experiment in which the culture was first filtered, the conjunctival reaction was very slight.

A positive result was obtained with the toxin of the staphylococcus provided that the strain was virulent, and the conjunctivitis resulting was very like that due to the gonococcus.

As the toxin of the pneumococcus is probably an endotoxin dead cultures of this organism were used, and generally in three and a half hours a conjunctivitis developed and disappeared on the next day.

In almost an identical way the bacterium coli commune produced a toxic conjunctivitis. With xerosis bacilli a very slight and transient reaction, which was not mechanical, resulted; this reaction was quite independent of diphtheria immunity.

From his experiments Tschirkowsky concludes that continued instillation of toxic substances will certainly produce a conjunctivitis, and that either the toxins are directly absorbed through the intact epithelium, or they first cause a superficial necrosis and then are absorbed. The toxin of diphtheria is the only one which produces a characteristic specific reaction.

The same author continues his investigations to include the endogenous action of toxins on the conjunctiva. A brief review of the previous experiments bearing on the question is given, and reference is made to the clinical observations which have been recorded in the case of gonorrhœa, measles, scarlet fever, typhoid and also sympathetic ophthalmia.

The author's own experiments were carried out with dysentery toxin, and he comes to the following conclusions:—

No conjunctivitis can be observed in animals during the first 8–10 hours after the injection, even when lethal doses of this toxin have been injected.

In some animals a conjunctivitis can be observed after a toxæmic condition has existed for a considerable time.

In those animals whose powers of resistance is greatly lowered by the injections, a conjunctivitis may develop, but it is an ectogenous one, in some cases due to organisms which may not be common conjunctivitis producers, such as the bacterium coli.

In his experiments he was only able to show that the toxæmic condition could cause an increase in the flow of tears.

On the whole, the experiments failed to show reasonable grounds for the supposition that a purely toxic conjunctivitis can develop by endogenous means.

ANGUS McNAB.

FRENKEL (Toulouse). **The Therapeutical Value of Subconjunctival Injections of Sterilised Air.** *Annales d'Oculistique.* March, 1908.

IN 1901 we heard Köster's views on the therapeutic utility of the injection of sterilised air into the anterior chamber in cases of tuberculosis of the iris and cornea. Since then we have had contributions from Chesneau and Lemeignan on the same subject. In 1906 the Tersons (Père et Fils) published their researches on subconjunctival injections of sterilised air in cases of various forms of suppurative and non-suppurative corneal ulceration and in 1903 they considerably widened the sphere of usefulness of the method by applying it to different affections of the anterior segment of the eye. They demonstrated by extensive trials that the treatment was painless and completely innocuous, that it hastened the cure of ulcers of the cornea, particularly the marginal type, that it was efficacious in phlyctenular keratitis, in sclerotising keratitis of young subjects, and that in several cases it caused the disappearance of hypopyon. It seemed, moreover, to have an elective action on photophobia.

Frenkel's observations are based on 51 cases which he has observed from the commencement to the end. The cases were chosen on account of their severity or on account of their having resisted treatment by other methods. The fifty-one cases are composed of phlyctenular kerato-conjunctivitis (8), fascicular keratitis (1), abscess of the cornea (13), central corneal ulcer (7), ulcers with pannus (7), ulcer with hypopyon (4), interstitial keratitis (3), and scleritis (1).

In the phlyctenular cases the injections had an immediate effect on the subjective symptoms, the photophobia pain and watering being soon relieved. The case of fascicular keratitis had resisted treatment by yellow ointment for 24 days; after using three air injections a cure was effected in 10 days.

In one case of ulcer it was necessary to use the cautery and in another the injection of air seemed to have the same effect on the ulcer as the cautery would have had. The five other cases were easily cured.

Four of the seven cases of marginal ulcers were brilliant successes. The pannus cases do not seem to have been attended by success. Frenkel's experiences with hypopyon ulcers were not as favourable as those of the Tersons, and he has to record

a lack of success in the three cases of interstitial keratitis and in the case of scleritis, which was of syphilitic origin.

In offering an explanation of the action of subconjunctival injections of air Frenkel suggests that there is an anæsthesia of the terminal twigs of the trigeminal set up, which brings about a cessation of the pain, photophobia and lacrimation. Whether this anæsthesia is due to the compression or stretching of the nerves he is unable to decide. As an alternative theory he suggests that to the oxygen contained in the injected air are due the results obtained, the oxygen stimulating the phagocytic action of the weakened leucocytes which are thereby enabled to carry on their reparative action more rapidly. Frenkel, however, does not devote much space to these conjectures, but proceeds to the more practical side of the question by offering us the following conclusions: Subconjunctival injections of sterilised air are innocuous; they seem to have no effect on diseases of the posterior section of the eye; in the diseases of the anterior segment those of the cornea and episclera are the most suitable for the subconjunctival injections; whereas in diseases of the iris and ciliary body it may be necessary to fall back on injections of air into the anterior chamber after the subconjunctival ones have failed. The superficial diseases of the cornea and episclera are more easily affected by the treatment than those of the deeper layers of the cornea and sclera. So that in interstitial keratitis and scleritis Frenkel has seldom got positive results. His most marked results have been in phlyctenular kerato-conjunctivitis, abscess of the cornea, central ulcer of the cornea, marginal ulcers and the old ulceration of pannus. Hypopyon ulcers, not due to dacryocystitis, are amenable to the method. On account of the manner in which the air influenced such symptoms as photophobia, pain and lacrimation, the injections may be used as an adjuvant to other therapeutic methods.

For intensity of action Frenkel places air injections after cyanide and saline injections but before mercurial or other ointments. In as much as the injections of air are calmative rather than exciting in their action, it is hard to compare them with injections of the soluble salts. It is not recommended to give more than five subconjunctival injections of air, at three day intervals: if a cure has not been obtained in fifteen days we are advised to try something else.

H. C. MOONEY.

TRANTAS (Constantinople). **Ophthalmoscopic Examination of Ciliary Region.** *Archives d'Ophthalmologie*. September and October, 1907.

By ordinary methods it is not possible to see by means of the ophthalmoscope any details of the fundus oculi which are situated as far forward as the ora serrata.

The author during the last seven years when using the direct method has been in the habit of pressing with the finger on that portion of the ciliary region that he wishes to examine and adding +4 to +8D to allow for the change of position caused by the pressure. He claims that by this method he can see perfectly not only the extreme periphery of the choroid and retina but also the ciliary region as far as the ciliary processes; the pressure must be applied gently and through the lid and the eye turned slightly in the direction of the region to be examined. From pathological examinations there is no doubt that except for the posterior pole more changes are found in this region than in any other.

A long list of cases is included in which changes in the ciliary region occurred, some with other fundus changes and many which could be diagnosed only in this way.

In 1899 the author published some observations on the ophthalmic lesions in leprosy. Till then it was not admitted generally that lepers showed fundus changes.

Rubert in 1905 examined ophthalmoscopically at Livonie 202 lepers, of these 47 or 23% showed fundus disease.

The author now records certain cases of choroïdo-retinitis, etc., in lepers in which the changes on account of their anterior position could be seen only by his method.

To acquire the necessary skill to examine the fundus in this manner some considerable time and perseverance are necessary, which is admitted by Dr. Trantas: the results seem to indicate that this time is well spent.

E. W. BREWERTON.

ULBRICH. **Senile Cataract, with Secondary Glaucoma.** *Zeitschrift für Augenheilkunde*, xviii., August, 1907.

THE swelling of a cataractous lens is not ordinarily reckoned among one of the causes of secondary glaucoma for the apparently good reason that ordinarily the lens when undergoing the cataractous process tends to shrink and not to swell. It is possible, however, that this does not hold good in all

stages of the process, and that in exceptional cases the swelling of the lens in the later stages of a primary cataract with an intact capsule may be the cause of a secondary glaucoma. Such cases have been observed by Hesse and by Elschnig, and in the present paper details of three fresh ones are given. It must be confessed, however, that the evidence is by no means conclusive. In the first of these cases extraction was followed by hypopyon and vitreous opacities, which seems to point to the glaucoma being secondary to something else than a swollen lens. The second case followed an attack of influenza, and in the third the high tension was only observed after the instillation of atropin. In none of these cases therefore does the evidence that the glaucoma was secondary to a swollen lens come to much.

A. H. T.

REUTER. **Unilateral Retinitis Pigmentosa.** *Archiv für Augenheilkunde*, April, 1908.

ACCORDING to the writer only eight cases in which this disease has been unilateral have been recorded, the first being as long ago as 1865. The fresh case here recorded is that of a man of 65 in whom the right eye was quite normal while the left showed a condition of typical advanced retinitis pigmentosa with complete loss of sight. The history is important, as in the year 1882 he had been a hospital patient with iritis and synechiae in the left eye, the fundus at that time showing no changes. Six years previous to that he had been under treatment for syphilis for six months. In the year 1899 he again came under observation, and at that time already had pigmentary changes and optic atrophy with nearly complete blindness of the left eye, which had since become absolute. It would add to the value of this paper if the condition of the choroid were mentioned, but presumably the only changes visible in the fundus were those detailed, viz., optic atrophy, shrinking of the vessels and bone-corpusele pigment. The rarity of this as a monocular condition justifies the publication of all similar cases. In this case the late onset and comparatively rapid course of the disease, and especially the fact that it followed undoubted syphilis, are noteworthy. Four out of the other eight previous cases showed signs of syphilis also, and in only two of them could syphilis be excluded.

A. H. T.

TRENDELENBURG and BUMKE. **Experimental Investigation of the Bach-Meyer Pupil Centre in the Medulla Oblongata.** *Klinische Monatsblätter für Augenheilkunde*, October—November, 1907.

IN 1898 Bach conducted decapitation experiments on monkeys, cats, and albinotic rabbits to ascertain whether the spinal cord had any relation to the light reflex. He found that the pupil retained its activity when the spinal cord was cut, providing a small portion (about 2 cm.) was still attached to the medulla. He considered that his experiments confirmed the hypothesis of Rieger and Foster, who from clinical observations deduced that the reflex centre should be in the spinal cord.

Ruge repeated Bach's experiments, anaesthetising the animals to prevent shock, and found that in decapitation between the first and second, or between the second and third, cervical vertebrae the light reflex continued for 30—40 seconds after the operation. After setting free the medulla and cerebellum he cut through the medulla at the upper part of the calamus scriptorius in the middle of the fourth ventricle. This did not affect the pupil reflex, both direct and consensual reflex lasting from 50 to 60 seconds after the operation.

The results of Bach and Meyer were as follows:—

1. Complete division of the medulla oblongata at the spinal end of the fourth ventricle caused immediate fixation of both pupils to light. Half division caused fixation of the pupil on the opposite side.
2. The exposure of the medulla oblongata diminished the light reflex and made the pupils very narrow and often unequal.

In the experiments of the authors there was neither myosis nor diminished light reflex after exposure of, or section through the fourth ventricle. Each section whether half or complete always had the same result, viz : mydriasis and increased light reflex. The fourth ventricle could be exposed and the medulla touched without causing myosis or affecting the light reflex. The findings of the authors were opposed to the medulla theory of Bach and Meyer and the cervical cord theory of Rieger and Reichardt.

H. HORSMAN McNABB.

SCHOELER (Berlin). **On Primary Tuberculosis of the Optic Disc.** *Klinische Monatsblätter für Augenheilkunde*, December, 1907.

TUBERCLE of the optic nerve is a not uncommon affection, being in most cases secondary to tubercular basilar meningitis or tubercular choroiditis and retinitis. But primary tuberculosis of this nerve, and especially of the disc, is very rare. Three cases previously reported, by Brailey, O'Sullivan and Story, and Coats, are here described, and to these the writer adds the notes of two further cases in which the diagnosis was made from clinical data. In neither case could any further evidence of tubercular disease be found in any other part of the body.

The first case was that of a middle-aged woman with a good personal, but strongly tubercular family, history. She had unilateral optic neuritis, the disc being more swollen at its upper and inner part than elsewhere. The choroid and retina both appeared perfectly free from tubercles. The vision was good, but the visual field showed slight concentric contraction. The swelling of the disc gradually diminished, and in time gave place to the appearance of atrophy, which became more and more marked. The vision sank and the field became contracted to a mere tube. A subcutaneous injection of tuberculin produced a rise of temperature, a reaction which confirmed the diagnosis.

The same means was employed to strengthen the writer's opinion of the nature of Case ii., a healthy young man, in whose family history there was positive evidence of tubercle. He too showed optic neuritis in only one eye. The changes in the disc was confined to its lower half, and the field of vision showed contraction at its upper periphery. There was an absence of oedema of the retina. The injection of tuberculin in very small quantity produced a marked rise of temperature, and was continued by way of treatment, but the disc became gradually pale and slightly atrophic.

Schoeler emphasises the importance of tuberculin as an aid to diagnosis as well as for treatment.

THOS. SNOWBALL.

A. A. HUBBELL (Buffalo, U.S.A.). **The Development of Ophthalmology in America.** Chicago: W. T. Keener and Co., 1908.

THE original of this little book was a paper read before the Ophthalmic Section of the American Medical Association, which has been enlarged and most copiously illustrated. The letterpress deals with the main incidents in the lives of the men who first set on its feet in America the science and art of Ophthalmology, with the early hospitals and benevolent institutions for persons suffering from diseases of the eye, and with the various factors in the development of the knowledge of the subject. The illustrations are for the most part portraits of the worthies whose very brief biographies are contained in the letterpress, the Agnews, Noyes, Horner, Derby, and many others. The book is evidently a labour of love by one intensely interested in his subject, a pleasant by-path of mildly antiquarian interest. It should appeal to a much wider circle in the States than with us.

W. G. S.

E. FUCHS (Vienna). *Text-Book of Ophthalmology.* Translated by A. Duane (New York). Third English Edition, translated from the Eleventh (German) Edition. London and Philadelphia: J. B. Lippincott Company, 1908.

THERE is no better single volume text-book than Fuchs's, none which combines so well fulness of clinical experience, abundance of knowledge of pathology with untiring study of its modern developments, insight into the numerous problems with which the subject teems, and clear explanation of principles. This new edition marks a very decided advance even upon its predecessors. Alterations and additions are to be found all through, but, as the preface tells us, the most marked changes will be met with in the sections on diseases of the cornea, the pathology of iritis, sympathetic ophthalmia, choroiditis, diseases of the optic nerve, disorders of motility, sinuses, and refraction. Sections on the subject of compensation for injuries, on diseases of the accessory sinuses, and on Hering's theory of space perception have been introduced. Over one hundred new illustrations have been added.

The translator has, as in previous editions, added material

from his own pen in a few parts where it appeared to him that the German text was incomplete, but he has the honesty to enclose these supplementary portions in brackets and relieve the original author of all responsibility for them by signing them with the initial letter of his own name.

The popularity of the work, deservedly great already, will be enhanced by the additional merits of this new edition.

H. TRUC, E. VALUDE, and H. FRENKEL. *Nouveaux Eléments d'Ophthalmologie*. Paris: A. Maloine. 2nd edition. 1908.

THIS work first appeared in 1896 written by Truc and Valude. This, the second edition, has been carefully brought up to date. It is a comprehensive treatise of nearly 1000 large pages. There are 282 figures in the text and 15 coloured plates. Amongst others, new chapters or paragraphs have been added on the following subjects:—Organo-therapy, serum-therapy, radio- and photo-therapy, and ophthalmic inspection of schools and of railway employés.

At the commencement of the work a *résumé* of the history of ophthalmology receives a chapter to itself. This subject is again brought in at various appropriate places throughout the volume.

Part 1 is concerned with the anatomy and physiology of the eye. Two of the twelve chapters composing this part are given to anthropology and comparative anatomy respectively. In part 2 is a description of the examination of the eye, visual acuity, field of vision, etc. The refraction of the eye, the different errors of refraction and their treatment are contained in part 3. General pathology is given in part 4, including the relationship of ocular disease to general disease. Special pathology, in part 5, occupies the next 300 pages, in which are discussed diseases of the eye—lens, iris, cornea, fundus, etc.—and its appendages, and affections of the orbit. It concludes with a chapter on comparative and veterinary pathology. Medical treatment is dealt with in part 6. The subject of lumbar puncture finds a place. The medical uses of the Röntgen rays are described. An account of special operations occupies part 7. The concluding chapters, contained in part 8, include the subject of hygiene and medico-legal matters.

A large amount of information is given in this book, which is more a work of reference than a text-book. The print is excellent, but the coloured plates representing normal and

pathological conditions of the fundus oculi are distinctly poor. We notice a few obvious errors or misprints, *e.g.*, in figure 9 is a branch from the third nerve supplying the superior oblique muscle. As may be expected in a work of this kind, some of the subjects are not so fully dealt with as others. Taken all in all, the authors are to be congratulated on their interesting, if somewhat lengthy, compilation.

NOTES.

THE EMPLOYMENT OF YELLOW-TINTED GLASSES

IN climates and conditions where the glare of light is great it is a frequent custom to use blue, dark, or "London Smoke" glasses, but these have the disadvantage of altering the aspect of things and of introducing an obstacle, by the reduction of light, in the way of persons whose vision is not accurate. It is now some time since Motais (Angers) first advocated the substitution of yellow for dark glasses. Persons troubled by glare, whether their eyes are normal or in a pathological condition, find these glasses pleasant to wear as they give a sensation of calm to the eyes and at the same time, so far from interfering with sight give a feeling of brightness. He concludes that it is not the luminous intensity which determines the injury to the eyes, and not the heat rays which do so, but the more actinic rays which are responsible. He has obtained therefore, with a view to the comfort of the eyes in hot climates, etc., a glass which will cut off as many of the rays at the blue-violet end of the spectrum as possible. For use in any artificial light rich in yellow rays the glasses in his opinion ought to be but feebly tinted: when there is any lesion of the fundus which reduces the visual acuteness the further diminution, great when blue or dark glasses are used, is only very slight when amber glass is employed. For use in tropical countries the deeper shades of yellow should be used. As an indication of their value Dr. Dye gives the illustration of persons consulting a map under the blazing Egyptian sun. This can hardly be done without glasses for the glare, or with them for the loss of illumination, but is quite easy with the yellow glass. They may be made with any focus required, convex, cylindrical, or whatever is needed.—*L'Ophthalmologie Provinciale*, February, 1908

A CASE OF GLAUCOMA SHOWING ANOMALOUS REACTION TO DRUGS.

LEPLAT (Liège) relates a singular case which seems to run counter to all one's experience of glaucoma. He was consulted by a maiden lady of 63 on account of troublesome dilatation of one pupil. A few days previously her brother had died, she had wept very copiously, and her left eye had become red and painful. She had consulted her family physician who had prescribed atropine. All the previous trouble had fled, but the dilatation of the pupil annoyed and dazzled the patient when reading, which she did a good many hours a day as she was much confined to the house. The eye was free of any injection and appeared quite healthy save for the mydriasis. Leplat advised to her have patience and she would be all right again in a few days, but she demanded immediate relief, so he instilled a small quantity of eserine. Judge of his astonishment when a few hours later he was summoned to see her, she having a typical attack of glaucoma: the tension was raised, the cornea steamy, the eye injected. The eserine having produced glaucoma, what was he to do? Having with him some atropine he dropped it into the eye, and the same evening the patient was quite comfortable and at ease, with a large pupil no doubt, but all pain and injection gone. Here is a case in which eserine produced glaucoma and atropine cured it! Leplat believes that the lady ultimately became blind of both eyes from glaucoma, but under what circumstances, and in particular how the other eye came to be attacked, he does not know, for he was not again consulted by her. *La Clinique Ophthalmologique*, xiv., 3.

 THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM

Thursday, June 11th, 1908.

The President, Mr. MARCUS GUNN, in the chair.

PAPERS.

An Epidemic of Contagious Conjunctivitis due to the Pneumococcus.—

Mr. P. H. ADAMS.

This paper dealt with an outbreak of conjunctivitis which occurred in a school containing 37 boys, 20 of whom became infected. The features of this particular type of conjunctivitis were some aching in the eyes at the commencement, followed by sticking of the lids 2 days later,

slight redness of the conjunctiva, and lachrymation. There was only a small amount of discharge. The affection appears usually in the spring, is not acute, and is very contagious. It is chiefly confined to children, and lasts from a week to a month. Smears were taken in almost every case, and gram-positive diplococci were found, some of which were definitely encapsuled. A growth on blood agar revealed typical pneumococcus.

In answer to some questions afterwards Mr. Adams said that inoculation experiments were not undertaken.

Lower Corneal Plaques.—Col. H. Herbert.

These are slightly raised greyish patches, with rough surfaces and feebly vascular, found occasionally in patients in India close to the lower margin of the cornea. General pannus was found associated in only a few instances. Apart from the curious shape of some of the patches the chief point of interest is the etiology of the condition. The patches appear usually to be due to abnormal exposure of this strip of cornea, together with chronic conjunctivitis, trachomatous or simple. But the cause of the defective closure of the lids was often obscure, and in some cases there was absolutely no evidence obtainable of defective closure. And the condition was not found with paralysis of the orbicularis muscle.

A Note upon Secondary (Parenchymatous) Xerosis.—Col. H. Herbert.

Attention was drawn to the influence of general pannus of both eyes in the production of xerosis secondary to old trachoma. The pannus renders the corneal surface somewhat insensitive: thence the blinking movements of the lids become infrequent and incomplete, and exposure of the cornea thus brought about adds to the loss of sensibility. In consequence of this the reflex action of the lids in some cases remains almost in abeyance. Thus there is a striking want of relationship between the xerosis and the cicatricial degeneration of the conjunctiva, to which the xerosis is ordinarily entirely attributed. In some cases of very marked retraction of the conjunctival fornices the cornea remains perfectly clear and moist, whereas in other cases with much less advanced cicatricial contraction the secondary xerosis is well marked.

Among other factors in the development of cicatricial xerosis should be noticed the reduced transudation of fluid from the general palpebral conjunctiva. If the upper lid be everted in an ordinary case of acute conjunctivitis, a very considerable flow of fluid from the exposed conjunctiva is readily demonstrable. A similar outflow is not obtainable from a cirrlosed (diffusely cicatrized) conjunctiva, however much conjunctivitis be present. In these shrunken conjunctivæ there is a dense and thick basement membrane.

Senile Cataract in Husband and Wife—condition of the Lenses in Children and Grandchildren.—Mr. E. Nettleship.

The husband and wife were both operated on for cataract, and of their 10 children 3 females had mature cataract, while 3 males and 1 female had incipient cataract; only the eldest and the youngest had escaped; and one was dead. Of the grandchildren 5 males had incipient cataract, though the changes were very scanty.

Mr. Nettleship discussed the relation of this family tree to the Mendelian theory. If the liability to cataract behave as a "dominant" several of the children ought to have shown it. In order to explain in simple Mendelian terms the incidence of cataract in the third generation, it must be assumed that the parents were "impure or incomplete dominants," each carrying the normal character obscured or hidden, but not destroyed, by the cataractous character, and this required that one of each of their parents should also have had cataract. As, however, it happened that the parents all died before the age at which it would develop the point can neither be proved nor disproved, but the assumption is a fair one. If the parents be "impure dominants" their offspring should, on the Mendelian theory, consist of dominants and recessives in the proportion of 3 of the former to one of the latter. The proportion of children in this genealogy who developed cataract to those who were normal was as three to one.

Lamellar Cataract, Coppock or Discoid Cataract, and Retinitis Pigmentosa, affecting different members of the same Pedigree.—Mr. E. Nettleship.

This genealogical tree related to 275 persons, of whom 110 were males, 115 females, while of 50 the sex was not recorded. All are descended from 2 brothers, and the chart is divisible into 2 parts, the larger (about 180), containing numerous cases of lamellar and Coppock cataract, and the smaller 32 cases of cataract and 15 of retinitis pigmentosa out of a total of 150. The presence of these two conditions associated in the same genealogy is doubtless due to each disease having been introduced by different ancestors from independent sources; and the fact that the retinitis pigmentosa is found only in the descendants of one brother inclines one to assume that the taint has been introduced through the wife. The pedigree also shows that Coppock cataract can develop in a child from a parent with lamellar cataract.

A Colour-blind family.—Mr. E. Nettleship.

This chart dealt with an attempt to examine the colour vision, by the ordinary wool tests, of all the available members of a rather extensive

pedigree of educated people. The three current generations contained about 110 persons; and the genealogy showed, so far as it went, the ordinary descent of this defect, viz.: all the offspring of the colour-blind ancestor escaped, but in the next generation a certain number of the sons of some of the daughters were colour-blind.

Accompanying these three papers was an exhaustive appendix, with details of every case examined.

CARD SPECIMENS.

Sky-blue Sclerotics.—Mr. G. Winfield Roll.

This was the case of a young woman whose sclerotics were of a uniform pale blue colour, a condition which had existed since birth. In all other respects the eyes were normal, and the vision with correction $\frac{6}{6}$.

Double Optic Neuritis of doubtful Syphilitic Origin.—Mr. G. Winfield Roll.

A male patient, aged 29, showed optic neuritis of both eyes, the right disc being more swollen than the left, with a good deal of œdema and some exudation in other parts of the fundus. There was a history of the primary sore in 1902 with slight eruption later, and ulceration of mouth 4 years afterwards. The right eye began to fail early in 1907, and the left in August of the same year. Mercurial treatment was adopted, but the vision gradually deteriorated until at the present time there was no P.L. in either eye.

A curious Congenital Anomaly of the Iris.—Mr. S. Stephenson.

In a male baby aged 15 months, brought for advice in May 1908, was found in the right eye a small oval pupil situated in the upper nasal quadrant, and on an anterior plane to this and partly covering it, was a curved piece of tissue of a light-blue colour, occupying the upper and inner part of the anterior chamber. At the extreme periphery in one part of this was a narrow zone of what appeared to be iris. No history could be elicited to account for this abnormality.

Connective Tissue obscuring the Left Disc.—Mr. L. Paton.

A male patient, aged 58, came with the history that the sight in the left eye had been bad for years; it was found to be $\frac{6}{60}$. A white structureless growth was seen to obscure almost entirely the left disc, the retinal vessels disappearing under the edge of it. To the nasal side of the disc was a patch of choroidal atrophy with some pigmentary

degeneration of the retina over it. Some white glistening spots appeared on the temporal side, with horizontal striation of the retina beyond. The right fundus exhibited arterial thickening.

Thiersch Graft of the Orbit.—Mr. A. C. Hudson.

This was the case of a young man in whom exenteration of the right orbit had been undertaken for sarcoma in November 1907. A month later, when the orbital surface had become covered with granulations, these were lightly rubbed over with gauze, and the whole cavity was lined with a single Thiersch graft from the arm. A protective gauze dressing was applied and firmly packed with cotton wool. It was dressed for the first time 6 days later, when the graft had united thoroughly, all the raw surface being completely covered.

A peculiar form of Retinal Disease.—Mr. A. Stanford Morton.

Henry H., aged 26, came for treatment with history of failure of vision in the right eye for one month, supposed to have come on suddenly; but this eye had always been divergent. The vision was hand movements at 3 in. and projection was bad except in the lower part of the field. The media were clear.

A coloured drawing of the fundus was exhibited which showed enormous masses of exudation in all parts of the fundus except upwards and outwards; the macula also was fairly free. The exudate was most dense in the neighbourhood of the main vessels which were pushed up by it. The disc was hazy but appeared otherwise normal. In the peripheral parts of the fundus the vessels showed many varieties of shape, size, and tortuosity, while here and there some hæmorrhages were visible; there was a certain amount of pigment scattered about, and in the upper part a mass of fibrous tissue projected forwards into the vitreous.

A month and a half later the eye was removed for secondary glaucoma.

The pathological report, by Mr. G. Coats, stated that the white exudate proved to be mostly due to swollen leucocytes in the sub-retinal space. The retina itself was thickened, degenerated, and widely detached. The mass of fibrous tissue was situated between the retina and the choroid, but more intimately connected with the former, and it contained blood and cholesterin crystals. The blood-vessels, which in some places were thrombosed and enormously dilated, showed a peculiar hyaline degeneration of their walls.

MALCOLM L. HEPRURN.

THE CORRELATION OF CONJUGATE TO PRINCIPAL FOCI IN LENSES.

By G. F. ALEXANDER, M.B., C.M. (Edin.), Major R.A.M.C.
(retired).

It seems desirable in the interests of the beginner in ophthalmic optics that a more simple and direct demonstration of the most important working formula of lenses than is to be found in the text-books should be forthcoming. It will, I think, be admitted that the demonstrations usually given, whether geometrical or algebraical, are rather cumbersome, and in many cases the formula is deduced indirectly or from others still more intricate, which few medical students have the time or inclination to unravel. Such a demonstration is very simply obtained by utilising the deviation of a Prism, and as I have searched a large number of works on the eye and on optics without finding it noted, I venture to bring it forward.

In Fig. 1 let θ be the angle of deviation of the prism, F the point in the base line at the distance f from the centre of its base, N, to which a ray Ac parallel to the base is deviated by the prism, and O an object in the base line at the distance o from N: a ray from O directed towards C will, after deviation, be brought to the base line at I distant i from N. let f_1, o_1 , and i_1 , represent the angles at F, O, and I respectively. As Ac is parallel to OI, $f_1 = \theta$ and the angle $ACO = o_1$, and it is obvious that when o is great compared with h the angle $FCI = o_1$, and f_1 , *i.e.* θ , being external in the triangle FCI, that $o_1 + i_1 = \theta$; now the

greater o is compared with h the smaller these angles are and the more nearly they vary as their tangents, *i.e.*, the more nearly $\tan o_1 + \tan i_1 = \tan \theta$, *i.e.*, the more nearly $\frac{h}{o} + \frac{h}{i} = \frac{h}{f}$ *i.e.*, the more nearly $\frac{1}{o} + \frac{1}{i} = \frac{1}{f}$ or $\frac{f}{o} + \frac{f}{i} = 1$.

In Fig. 2 it may be similarly demonstrated that $\frac{1}{i} - \frac{1}{o} = \frac{1}{f}$ or $\frac{f}{i} - \frac{f}{o} = 1$. Now as a lens in regard to refraction may be considered as made up of an infinite number of prisms whose sides are tangential to its surfaces at all points where rays are incident upon them, Figs. 1 and 2, the farther from the axis rays parallel to it are, the larger is the refracting angle of the "prism" they encounter and consequently the greater will be their deviation so that they tend to meet the axis approximately at the same point F, *i.e.*, the principal focus of the lens, and as in regard to any one of these "prisms" the above relationship of o , i , and f holds good, in the case of a convex lens in which f is the focal length, o the distance of a point O in the axis beyond F, and i that of its conjugate I, the formula $\frac{1}{o} + \frac{1}{i} = \frac{1}{f}$ or $\frac{f}{o} + \frac{f}{i} = 1$ maintains as sufficiently approximate for practical purposes: in the case of a concave lens the formula $\frac{1}{i} - \frac{1}{o} = \frac{1}{f}$ or $\frac{f}{i} - \frac{f}{o} = 1$ similarly maintains. The demonstration is farther of use in indicating that for purposes of construction the focal length of a thin lens must be taken as the distance of the principal focus from its centre, as in standard works on optics it is common to find the focal length defined as the distance of the principal focus from the lens which, though sufficiently approximate

for purposes of calculation, is apt to lead beginners at construction work into difficulties.

Fig 1.

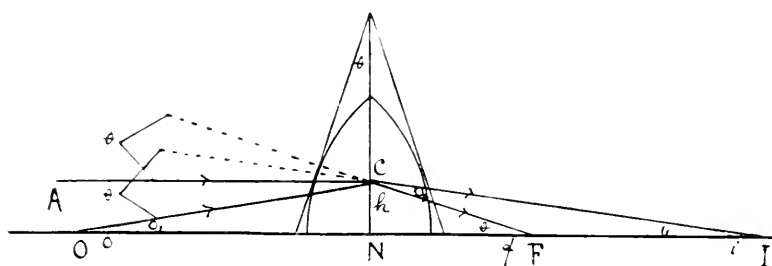
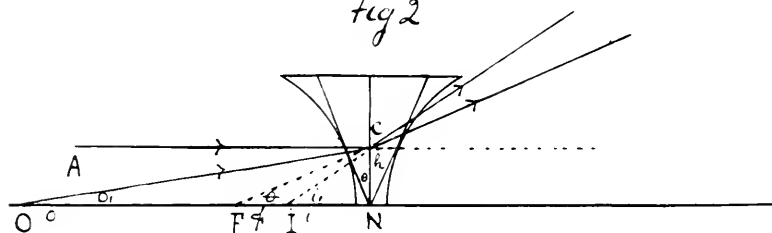


Fig 2



A CASE OF THROMBOSIS OF THE CENTRAL ARTERY OF THE RETINA.

By N. C. RIDLEY, F.R.C.S.,

Ophthalmic Surgeon to the Leicester Hospital.

MR. R., a manufacturer, æt. 49, was sent to me on Dec. 5, 1907. He said that five hours before he suddenly found that he could not see with the right eye, which previously had been a good one.

On examination the right pupil had very little, if any, primary reaction to light, and the left had no secondary reaction. They were of equal size.

R.V.=Faint shadows only.

L.V.= $\frac{6}{5}$: c + .5 Dsph= $\frac{6}{5}$.

On examination of the right fundus the disc was not found to be pale, but the arteries were reduced to mere threads, and the veins were somewhat smaller than normal, with the blood in them broken up into beads with clear spaces between. It could readily be seen that there was no flow in the veins, but a gentle oscillating movement of the broken blood columns, tending in a backward rather than in a forward direction. The macula region was slightly more red than the rest of the fundus, but there was no definite cherry-red spot. There were no retinal hæmorrhages. The media were clear.

The left fundus and media were normal.

Rest and iodide of potassium were ordered.

On Dec. 28th the patient was seen again, when the vision was found to have improved. He saw more light, and could count fingers at the periphery of the field, better at the temporal side than the nasal. There seemed to be a large central scotoma. The disc was paler than on the previous occasion, the vessels, though still contracted, were larger, more especially the arteries; there was a flow of blood in them and distinct venous pulsation; and the column of blood was not broken anywhere.

A month later there was still more vision, especially at the outer side, the right pupil was active, the scotoma smaller, and the vessels uniformly larger than before.

Six weeks later, although the vision was less than $\frac{6}{60}$, it was improved, the central scotoma was about as large as

before, but the patient thought it less dense. Disc somewhat paler, vessels unaltered.

Since then there has been gradual but very slight improvement. The eye is quite useful, owing to the fair peripheral vision, $\left(=\frac{2.5}{60}\right)$ and the patient can see objects moving across the central shadow. Except for the pallor of the disc and the slight uniform contraction of the vessels, only noticeable on comparing both fundi, there is now nothing wrong to be seen in the right eye.

Gentle massage was performed on the occasion of the first visit and once during the next week, but it was discontinued when the vision began to improve, the idea being that if the obstruction were an embolus it had already moved, whereas were it a thrombus harm rather than good would ensue if it were dislodged.

As there was no sign of one branch of the artery being more blocked than the rest after the improvement, it seems most probable that the obstruction was a thrombus, whose shrinking had partially restored the circulation. The patient had no cardiac lesion; he simply complained of being overworked and run down.

REVIEWS.

VAN DUYSSE (Ghent). **Obstruction of the Central Retinal Artery.** *Archives d'Ophthalmologie*, March, 1908.

L. CASPAR (Mülheim). **Embolism of the Central Retinal Artery.** *Centralblatt für Praktische Augenheilkunde*, October, 1907.

For a reason which we shall mention immediately this subject has constantly attracted the attention of observers in all countries, and among numerous papers there are two recent ones which deserve notice. That by Van Duyse is partly historical, that by Caspar is an interesting record of a case in which also an unusually favourable result was secured.

The peculiar interest of the affection—usually spoken of as embolism of the central retinal artery—is the uncertainty of the pathology, at least in a very large proportion of the cases. It is in point of fact more than doubtful whether in any case a strict embolism in the sense in which the expression is applied to this disease has ever received anatomical demonstration. In a great many cases—in 66 out of 95 investigated by Kern—there was no evidence whatever in the general state of the patient to point to any source for the embolism. Mean-time, therefore, in the present state of our knowledge, it is perhaps best to employ the term “obstruction” for the instances of this clearly marked clinical entity,—a term which commits one to no particular theory of the origin. In some of the cases the first symptom has been the complete, permanent, immediate blindness, and it is not unnatural to consider these cases as embolic; on the other hand, where there have been previous similar attacks, but transitory and incomplete, one might consider the origin to be more probably an endarteritis, or a thrombus completing the closure of an artery already narrowed by arteritic processes. These transitory attacks are probably in part at least due to spastic contraction of the vessel walls,—a spasmodic anæmia of the area of distribution; and when, as sometimes happens, treatment is followed by immediate and possibly permanent cure, it is not to be wondered at if the surgeon congratulates himself on his success, though his treatment may in point of fact have had little to do with the result.

Van Duyse relates the case of a lady of 72, whom he saw one hour after the sudden occurrence of loss of sight in the right eye. At that time there was no perception of light, and the pupil was semi-dilated and immobile. At the immediate centre of the disc the arteries had disappeared into mere threads, but speedily regained their calibre: the same was true of the veins. In one vein the broken column of blood was readily observable. In the wall of one artery a little patch of hardening of vessel wall was also visible, but no retinal hæmorrhages were to be found. Speedily vision rose to $\frac{6}{6}$ on correction. There was neither sugar nor albumin in the urine, nor any abnormality in the fundus. The patient had for years been greatly afflicted with migraine.

In this case of “embolism” it is plain that though all perception of light was lost, circulation was not completely

brought to a standstill; the movements visible in the broken blood column in one of the vessels proved that. It must be a very rare occurrence that an eye from which all perception of light had disappeared, from any cause whatever, should regain $\frac{6}{6}$.

The account which Caspar (Mülheim) gives of a case of his has also more than usual interest. His patient was a woman of 51, who stated that just one hour previously she had suddenly and without warning lost the sight of her left eye. Medical examination proved negative: the general condition seemed normal and the heart sound. Direct action of the pupil was gone, the disc was pallid with indefinite margins, the retinal arteries thready, and tapering to nothing ere they reached the periphery; the veins too were narrow. The eye was absolutely blind. Fortunately the right eye was in all respects normal. The treatment immediately adopted was to give cocain and apply vigorous circular massage; this had, however, no immediate effect. Next morning at nine o'clock she reported that for the last two hours she had been able to see a little, and was found to be able to count fingers close to the eye and to possess a good field except to the lower and outer sides. The disc was still white and badly defined, but the retinal arteries were somewhat better filled than on the evening before; the superior nasal artery on the disc and for a short distance beyond it was empty of blood; further away it was thread-like. All the other vessels, both arteries and veins, appeared to be better filled than on the previous evening; massage was repeated. By the same afternoon vision had risen to $\frac{1}{50}$ excentrically upwards; the lower outer portion of the field was gone. There was a milky opacity of the posterior part of the fundus, amid which a cherry-red spot was now quite apparent. The superior nasal artery was filled with blood in parts, but at the disc it was empty. There is no need to recapitulate the details of progress: the important points are two in number—first, that eventually an extraordinarily good result was obtained, the patient recovering vision up to $\frac{3.5}{5}$, though with a much restricted field and a relative central scotoma; and, second, that in the writer's opinion this excellent result was attributable in large part to the favourable effect of massage; after each time of the employment of massage vision was better than before it.

Encyclopédie française d'Ophthalmologie. Edited by Drs. Lagrange and Valude. Vol. vii., 1908. Paris: Octave Doin.

THIS excellent and comprehensive treatise has now been completed as far as Vol. vii., which maintains the high character of its predecessors. The contents of Volume vii. deal with affections of the crystalline lens and of the optic nerve, with paralysis of the ocular muscles, and with hemianopsia: the articles in it are from the pens of H. and L. Dor (Lens), Dufour and Gonin (Optic Nerve, except the tumours), Lagrange (Tumours of the Optic Nerve), Sauvigneaux (Muscles), Rochon-Duvigneaud (Hemianopsia); there are over 800 pages included in the volume, with numerous black and white diagrams and one coloured illustration.

BÉAL. **The Electro-magnet in the Extraction of Foreign Bodies from the Eye.** Paris: Steinheil. 1908.

THE giant magnet has been less used in France than in some other countries, and Dr Béal writes to give his compatriots the results of the experience which has been gained in the clinique of M. Morax, where a Volkman magnet has been in use during the last eight years. At the same time we think that others who are contemplating making a first essay in the use of these powerful instruments might do worse than possess themselves of this little book. It contains a clear account, sufficiently illustrated, of the methods of diagnosing the presence and position of magnetic particles in the eye, and of the mode of their extraction, with a short chapter on the ultimate results of the operation. It is essentially clinical and practical.

L. ANCONA (Milan). **Panophthalmitis Caused by the Bacillus Subtilis.** *La Clinica Oculistica*, May, 1908.

THERE are only a few instances recorded of panophthalmitis which has been caused by the bacillus subtilis. Yet according to Ehrenberg the organism is found widely distributed in nature, in the air, in water, and in soil, and it apparently can exist for some time in association with the eye without giving rise to any reaction at all: it may, on the other hand, as numerous experiments have shown, become actively toxic and injurious, setting up a violent panophthalmitis. Curiously enough a large proportion of the few published instances of this have had their origin in Switzerland.

The patient, in the instance recorded by the author, was a country-woman of 33, who had always had good health: while at work in the fields one summer day she was struck on the right eye by a small stone. She did not think at first that the accident was other than trifling, and applied simple remedies, but after three days she could endure the pain no more, so consulted a doctor by whom she was referred to Ancona. Both lids of the right eye he found to be reddened and swollen, the eye itself a little protruded, with much inflammation of the conjunctiva and with a hazy infiltration of the cornea, which at one point had become eroded: the iris was congested: through the pupil came a yellow reflex, and the globe itself was fixed, immobile. The patient complained further of very severe pain in and around the eye, and the diagnosis was obvious:—panophthalmitis of traumatic origin. This being so the great point of interest was to discover what organism was responsible for the unfortunate occurrence. It appears to be the case that when an eye is destroyed by the action of the bacillus subtilis other organisms obtain access to it, flourish more rapidly and vigorously, and finally destroy and oust the original bacterium, so that if more than a few days elapse the bacillus subtilis may actually be no longer to be found. In this instance the author became very uneasy as to the success of his investigation into the bacteriology because the patient declined emphatically all surgical interference until seven days after the onset of the mischief. Finally, however, evisceration was performed, and cultures and smears carefully taken: from examination of these, which were submitted to various tests to make certain of their identity, the author was satisfied that the bacillus subtilis existed in practically pure culture. The precise details as to the culture, appearances, reactions, etc., are best studied in the original article: it is sufficient here to record the unusual occurrence.

W. G. S.

VAN DEN BORG. Optic Neuritis Associated with Disease of the Anterior part of the Eye. *Klinische Monatsblätter für Augenheilkunde*, April, 1908.

H. HAPPE. On Optic Neuritis Associated with Slight Perforating Injuries of the Anterior Part of the Eye. *Ibid.*

OPTIC neuritis in connection with affections of the anterior part of the eyeball is a subject concerning which very little has been written, and one which is not as yet very well under-

stood, therefore the present papers will be of interest for the light which they throw on the matter.

Borg begins with a brief outline of the scanty literature. To Hirschberg is due the credit of being the first to draw attention to the relation between optic neuritis and disease of the anterior part of the eye. So far back as 1888 he stated that in perforative injuries optic neuritis might occur, but that it could not usually be seen owing to the opacity of the media. Other communications followed by Fehr, Uhthoff, Elschmig, and Stock. A microscopic examination in Stock's case showed little or no change in the vitreous humour or retina.

Van den Borg's own contribution consists of descriptions and analyses of 9 cases, with microscopical examinations, and some experimental evidence. There are three cases of perforating injuries, a partially phthisical eyeball the result of an old-standing iridocyclitis following measles, a case of acute iritis, and four cases of tubercular disease of the iris and ciliary region.

In most of the cases the presence of optic neuritis was only revealed by microscopical examination, but in some it was observed ophthalmoscopically. The swelling of the optic nerve is mainly serous, as in choked disc from cerebral tumour; moreover it resembles the latter also in the fact that the vision may be perfect, or at least the defect is not greater than can be accounted for by the condition of the media or anterior part of the eye. There is usually a slight degree of lymphocytic infiltration round the point of emergence of the central vessels and their chief branches, and frequently small collections of lymphocytes are found deposited on the retina close to the disc. The affection is clinically harmless, the optic nerve recovering completely when the anterior part of the eye heals.

Straub had already found these accumulations of leucocytes in cases of experimental tuberculous cyclitis. He believed that they came from the ciliary region, and followed the normal lymph channel, to become finally deposited on the optic disc. Van den Borg himself obtained similar results in cases of artificially produced infective cyclitis. Cultures of staphylococci were introduced into the anterior chamber of rabbits' eyes, the effect being a severe iritis and swelling of the optic disc, although the micro-organisms themselves did not travel beyond the posterior surface of the iris. Stock had

also experimented in the same direction. He injected cultures of bacillus pyocyaneus into the aural veins of rabbits and thereby set up an infective iritis. In more than half the cases the optic nerve sheath was infiltrated with round cells, but the micro-organisms did not go beyond the iris, hence he concluded that the neuritis was caused by toxins which were carried by the lymph stream into the nerve sheath. Van den Borg believes that when the toxins gain access to the vitreous humour they increase the secretion and rate of flow of the lymph and exercise a chemotactic attraction on the leucocytes, which collect in those places where the poison is most concentrated. The leucocytes come mainly from the cilio-retinal vessels, but also from the ciliary region, since they are found fixed in various amœboid shapes in the vitreous as if streaming towards the disc.

The main points regarding optic neuritis caused by disease or injury of the anterior part of the eye are briefly these:—The swelling of the optic disc resembles choked disc both as regards its nature and its effect on vision: it is an indirect result of the inflammation of the anterior part of the eye, being caused by the resultant toxins: the papillitis is not a serious condition and recovers completely with the subsidence of the original cause.

Happe's two cases demonstrate the remarkable want of correspondence between the relatively slight affection of the anterior part of the eye and the intensity of the ophthalmoscopic changes. They also show that the papillitis may continue to increase for a time even when the refractive media have become transparent and the inflammation of the front of the eye has subsided. The optic discs in both cases became normal with vision of 5_{18} in one instance and of 6_6 in the other. Happe draws attention to the fact that a similar form of optic neuritis occurs in purulent otitis accompanied by intracranial complications, and that the neuritis may increase also for some time after the disappearance of the cerebral condition. Cases of the kind have been recorded by Korner and others, who have regarded the papillitis as the result of a toxic meningo-encephalitis. Happe makes two suggestions with regard to the causation of the neuritis in his cases, namely the possibility of cytotoxins playing some part in its production, and further the possibility of the perichoroidal spaces being opened by the injury and acting as a path for the toxins.

L. W.

v. HIPPEL (Heidelberg). **On Interstitial Keratitis and Ulcus Internum Corneae.** *v. Graefe's Archiv.*, lxxiii., 2.

IN this paper the author gives an account of the microscopical examination of the eye of a child aged thirteen years, the subject of recurrent attacks of interstitial keratitis. An optical iridectomy had been performed four years previous to the excision. The eye was excised on account of pain and blindness accompanied by increased tension.

The microscopic investigation left some doubt as to the cause of the keratitis, as although giant cells were present no tubercle bacilli were found, nor did the impregnation method shew any spirochaetes.

In two places Descemet's membrane was perforated, thus forming an internal ulcer of the cornea.

He also gives an account of the cornea of a still born child, in which there were present various other conditions due to congenital syphilis. In this case numerous spirochaetes were found in those parts of the cornea that shewed the greatest amount of anatomical change. Such a case tends, in the opinion of the author, to shew that interstitial keratitis is not a metasyphilitic affection, but is directly due to the action of the parasite.

An account is also given of the microscopical examination of an eye, previously referred to by the author in his account of ulceration of the posterior surface of the cornea.

The author concludes that the anatomical examination of this eye confirms the clinical diagnosis of ulcer of the posterior layer of the cornea.

He is of the opinion that such ulcers may explain the occurrence of congenital staphyloma and leucoma. The fact that the iris may become adherent to the back of the cornea in no way invalidates this theory, as it will be possible in such circumstances to get the formation of a leucoma with deep anterior chamber, or a staphyloma with obliteration of the anterior chamber.

He is willing to admit that all such cases need not be preceded by a genuine internal ulcer, as other congenital inflammatory processes of the deeper layers of the cornea may lead to ectasis of that structure.

The important point demonstrated is that staphyloma and adherent leucoma may exist without any superficial ulceration.

perforation, or even purulent softening of the cornea. The establishment of this fact renders the explanation of congenital defects of this nature more simple.

It is to be noted that in these cases of the author, as in most of those in which an internal ulcer of the cornea has been discovered anatomically, the tension had been raised.

E. E. HENDERSON.

JAKOB STERN. **On a Hitherto Undescribed Phenomenon in Trigeminus Anæsthesia.** *Klinische Monatsblätter für Augenheilkunde*, May, 1908.

THIS observation was made in a female patient who had previously suffered from corneal ulceration, presumably of a phlyctenular nature. The author in testing the vision found most remarkable variations in acuity in very brief intervals. These he found to be due to the appearance of numerous grey dots either in or immediately under the corneal epithelium, the surface of which remained unaffected. These dots stained with fluorescein, and disappeared or increased in number during observation. Although resembling the effects produced by drying of the corneal epithelium, they bore no relation to this, and were produced in exactly the same manner when the epithelium was protected by an occluding bandage. The cornea had lost its sensibility, but the place of exit of each supra-orbital nerve was extremely sensitive to pressure. The intra-ocular tension was normal. Two months later the cornea had recovered its sensibility and the opacities were no longer observable. During the whole period there was no inflammatory reaction.

The author had met with somewhat similar appearances in five other cases, in all of which the sensibility of the cornea was diminished. He is inclined to ascribe the phenomenon to the defective condition of the surface epithelium permitting the entrance of fluid, and this defective condition to interference with nutrition caused by the state of the fifth nerve.

He suggests that this observation may throw some light on the occurrence of neuro-paralytic keratitis

E. E. HENDERSON.

AUBARET (Bordeaux). **The Valvular Folds of the Canaliculi and Nasal Duct from the Anatomical and Physiological Standpoint.** *Archives d'Ophthalmologie*, April, 1908.

THE various mucous folds or valves which have been described in connection with the lachrymal passages are thus classified by Aubaret:—

1. Inferior valvular fold: valve of Bianchi; valve of Cruveilhier; valve of Hasner.

2. Valvular folds of the middle segment of the canal: valve of Taillefer.

3. Valvular folds at the upper end of the canal: valve of Bérard; valve of Krause.

4. Valvular folds of the lachrymal sac: transverse fold of the internal palpebral ligament.

5. Valvular folds of the saccular orifice of the canaliculi: valve of Rosenmüller; valve of Huschke.

6. Valvular folds of the canaliculi: valve of Foltz; valve of Bochdalek.

i. The most important of these is the inferior valvular fold. This generally goes by the name of the valve of Hasner but it was first described by Bianchi, who recognised the valvular character of the structure, which allows of the free passage of tears into the nose but in most cases prevents regurgitation of fluids from the nose into the conjunctival sac. He also described cases in which, owing to insufficiency of the valve, fluids and smoke could be forced up along the nasal duct and canaliculi. Bianchi also declared that a stylet could be easily passed down the duct but gave no instructions as to the method of performing the manoeuvre, described later by Laforest. Morgagni opposed Bianchi's views and considered that this mucous fold was no more a valve than the mucous folds at the entrance of the ureter into the bladder. Vesignie held similar views. The descriptions of the valve given by Cruveilhier, Bérard, Hasner and Richet are based on those of Bianchi. Taillefer, Huschke and Osborne detailed the varying forms which the inferior opening and valve may assume. Sappey showed that the diameter and form of the orifice varies with its relations to the meatus. When it opens high up it is round or infundibuliform and large; as it approaches the floor it gets more vertically oval, so that at a distance of 4 or 5 millimetres below the meatal roof it becomes a mere vertical slit some-

times very difficult to see. Although formerly valves in the form of a diaphragm with a small hole in the middle and semilunar valves were described, present day anatomists regard these mucous folds, so varied in size and position, as not worthy of the name of valves. Complete obstruction of the meatal opening of the nasal duct is a frequent factor in dacryocystitis in the newly-born (Rochon Duvigneaud) and may lead to the formation of a terminal cyst extending almost to the floor of the nose (Bochdalek). This must not be confounded with a slight dilatation of the lower end of the canal observed by Cruveilhier and Aubaret.

ii. The valvular folds in the middle segment of the nasal duct. The only fold of any consequence goes by the name of the valve of Taillefer. It is inconstant (6 per cent.) and its free edge is generally directed upwards. It is more marked in the newly-born and tends to disappear with advancing age. It is so variable in size, position and form that it can hardly be looked upon as a valve in the proper sense of the word, although Aubaret found that in some rare cases, where the valve of Hasner was insufficient, the valve of Taillefer prevented the regurgitation of fluid forced up the duct from the nose. Sometimes these folds are long and being directed somewhat parallel to the axis of the duct form diverticula which simulate duplication of the canal.

iii. Valvular folds at the junction of the sac and the upper end of the canal—valve of Bérard or valve of Krause. This fold is probably produced as the result of the formation of a cul-de-sac through the mechanical distension of the part of the sac below the internal palpebral ligament. Its base is attached to the lower and outer part of the sac and its free edge is directed obliquely upward and inwards. Very exceptionally it may be divided horizontally in the form of a sphincter or diaphragm with a small hole in it. Its position, size and shape are very variable.

iv. Valvular folds of the lachrymal sac. In the newly-born the mucous membrane of the lachrymal sac is of the type designated utricular by Aubaret. In the adult most of the folds disappear. Of those that remain one is found on the anterior wall and corresponds to the position of the internal palpebral ligament. It is marked only in cases of distension of the sac and in some cases may be so prominent as to give rise to an apparently bilocular sac. In some cases a vertical

fold may be the cause of sacculation, or the folds may be such as to give rise to an appearance of acinous glands.

v. Valvular folds at the saccular orifice of the canaliculi. The canalicelli may enter directly, by one or two openings, or indirectly, by a dilated diverticulum known as the sinus of Maier, which is either a saccular prolongation of the sac or a dilatation of the united canaliculi. At the upper part of the canicular duct or sinus, Rosenmüller described a valvular mucous fold and at its lower part Huschke described a similar fold. The latter is semilunar and its free edge is directed upwards and tends to close the entrance of the canaliculi. Bérand described a small tubercle on its free edge (cf. *globulus arantii*). Its weight was supposed to keep the valve open except when pressure was applied from the side of the sac.

vi. Folds and valves of the canaliculi are only found in rare cases. Bochdalek described an annular fold constricting the canicular punctum. Beyond this there is a small infundibuliform dilatation and then a constriction called *angustia* by Gerlach. In the neighbourhood of the *angustia* there is a valvular fold which has been called the valve of Foltz. These folds should almost be regarded as congenital anomalies. Mucous folds towards the saccular ends of the canaliculi may be such as to form diverticula and give rise to an apparent formation of two or even three canals.

The question of the valvular nature of the mucous fold at the meatal end of the lachrymal duct was the cause of a prolonged controversy between Bianchi and Morgagni. Richet considered that it always formed an efficient valve and on that assumption formulated his aspiratory theory of the excretion of tears. Bert found that in some cases (3:18) the valve was unable to prevent the regurgitation of fluids from the nose. In these cases he found that the meatal opening of the duct was large and open and the mucous fold very small. In the cases in which fluids could not be forced up the lachrymal passages the valve of Hasner was well-developed and closed the opening when pressure was applied to the liquid in the nose. The orifice was also very small, punctiform or even invisible. These two types were met with in one head examined by Bert. Direct injection into the canal by means of a fine canula was always followed by regurgitation into the conjunctival sac, so that the valves of Bochdalek, Rosenmüller, Bérand and Taillefer were considered to be always inefficient.

Bert's experiments were made by blocking up all the openings into the nose except the nasal duct and applying pressure to the liquid with which the nose was filled. Aubaret has constructed an apparatus which gives more exact results. He applies the pressure directly to the inferior orifice of the nasal duct by means of different sized funnel-shaped glass tubes—if necessary surmounted with rubber rings—which fit accurately over the duct openings without causing any obstruction of the canal by pressure.

The glass tube is connected by means of rubber tubing with a pump and a manometer to record the force of pressure or aspiration applied.

Aubaret finds that in those cases in which the valve is competent the lower orifice of the duct is prolonged into a deep narrow groove of varying length and the valvular fold stretches between the edges of this groove.

Where the lower opening is wide and large and the edges of the valve do not reach the walls of the duct the valve is incompetent.

In about 90% of adults the latter condition prevails, while a competent valve is comparatively rare (4%). Whether this is due to an atrophic condition of the mucous membrane of the nose and nasal duct in advancing age remains to be shown.

J. JAMESON EVANS.

ELIA BAQUIS. **On the Pathological Anatomy and Pathogenesis of Cyanosis Retinae, together with some remarks on the Etiology of Glaucoma.** *v. Graefe's Archiv.*, vol. lxviii, 2.

CYANOSIS retinae is a condition that has several times been found in patients affected with general congenital cyanosis. In the cases previously recorded only the clinical or ophthalmoscopic appearances were described: these consisted of great dilatation of the retinal veins and capillaries, with or without dilatation of the arteries, an abnormal colour of the blood, but at the same time good visual acuity. The case of which Baquis here gives an account is interesting not only from the difference which it shows from previously described cases in certain of its clinical features but also from the fact that it is the first in which the eyes have been examined microscopically.

The patient was a boy of eleven years whose general appearance was that of marked cyanosis, a condition that had existed from birth. His sight became suddenly reduced almost to p.l.,

and while it was found impossible to examine the fundus of one eye, the other exhibited an enormous dilatation and tortuosity of the retinal veins, which extended down to the very smallest branches, an entire absence of the retinal arteries (except for a very short distance just beyond the optic papilla), swelling and blurring of the edges of the disc, together with rounded and flame-shaped hæmorrhages between the disc and the equator, and whitish spots of degeneration here and there over the retina—in fact an ophthalmoscopic picture similar to that due to thrombosis of the central vein.

Another point of interest was the fact that the colour of the iris, first in one eye and then in the other, was suddenly changed from its normal light blue tint to a chestnut-brown, a change due to the enormous dilatation of the veins, as was shewn by the fact that immediately after death the irides resumed their original colour.

It may be mentioned that at the autopsy the heart showed enormous hypertrophy, particularly of the ventricles and the interventricular septum: the pulmonary artery was very much reduced in size, while the adhesions of the cusps of the pulmonary valve to one another was such as to make the opening into the artery still narrower: there was moreover an opening in the interventricular septum allowing thereby a free passage of blood from the right to the left ventricle. The most important change in the general circulatory system consisted of a marked dilatation of the capillary network with normal veins but extraordinary contraction of the arterioles.

A full description of the various microscopical appearances is given but it is impossible to refer to them in detail here. The most interesting and important changes are to be found in the condition of the retinal vessels, for in them lies the direct cause of all the other changes. The central artery and vein reach the lamina cribosa and pass through it into the eye unchanged. In the papillary area the vein and its main branches exhibit a marked narrowing of their lumen, either through thickening of the wall due to endothelial proliferation, with or without swelling and hyaline degeneration of the adventitia, or through pressure from the œdematous tissue around: towards the equator the veins show still more marked changes, being almost obliterated and hardly distinguishable from the arteries: while still further forward they are much dilated, with greatly attenuated walls.

The arteries exhibit various degrees of contraction up to complete obliteration, a change brought about by slight thickening of the intima but more particularly by an immense hypertrophy of the middle coat of the vessels and contraction of the muscle cells proper. This hypertrophy of the muscular coat is also very well seen in the arteries of the choroid as well as in those of the sclerotic and iris.

The changes in the arteries and veins were in places so far advanced as to preclude the possibility of inferring where they had begun first, but where the author was enabled to decide he was convinced that the changes in the veins had begun after and were secondary to those in the arteries. He rejects the idea of a primary thrombosis of the central vein on various grounds, which may be put shortly as follows:—the absence of any signs of dilatation or stasis in the veins in any other organ, the absence of any thrombosis in the intra-neural part of the central vein, or of any local endo- or periphlebitis, and the great contraction of the small retinal arteries. Nor does he think that the venous thrombosis has been due to hæmorrhagic infarcts of the retina following multiple emboli in the smaller arteries, because (*a*) there was nothing in either the endocardium or the large vessels to give rise to emboli, (*b*) it would have been most singular if such emboli should have reached both retinae simultaneously, and (*c*) there were no signs of emboli in the main retinal artery.

The real initial cause of this thrombosis, according to the author, lies in the changes that occurred in the small branches of the retinal artery (in common with the arterioles throughout the body), viz., spastic contraction and hypertrophy of their muscular coat, not endarteritis. In looking for the cause of this hypertrophy we must remember that the heart exhibited stenosis of the pulmonary artery as well as a communication between the two ventricles, thereby allowing of the easier passage of blood from both ventricles into the general circulation. But immediately after birth some blood must have begun to flow into the lungs, otherwise the child would not have survived: and there must have been some peripheral resistance in the general circulation to hinder the passage of the blood through the left ventricle and favour its flow through the pulmonary artery into the lungs. This peripheral resistance was brought about by the fact that the blood stimulated the vaso-constrictor centre in the medulla through the excess of CO_2 which it con-

tained at the moment of birth and produced a reflex contraction of the arterioles throughout the body. The incomplete aëration of the blood kept up the general cyanosis and at the same time maintained a chronic stimulation of this vaso-motor centre: hence arose the spastic contraction of the arterioles. This spasm alone being insufficient to keep up the resistance there followed a real hypertrophy of the muscular coat of the small arteries: and in this hypertrophy the retinal arteries participated. The constriction of the retinal artery led to marked venous stasis followed by the retinal hæmorrhages and the thrombosis of the branches of both artery and vein.

The difference between the clinical and ophthalmoscopic signs in this case and those cases previously recorded is really one of degree. In the latter the arteries were more or less full, the cardiac lesion was fully compensated, and the defect in the oxygenation of the blood was such as to excite only a moderate stimulation of the vaso-motor centre, such as leads to contraction of the visceral blood vessels alone: the blood is thereby driven into other organs, the retina included, and their vessels become dilated.

As regards the author's remarks on the etiology of glaucoma, it is necessary to refer shortly to the changes that were found at the angle of the anterior chamber on microscopical examination. These consisted of a dense infiltration of cells, uni- and multi-nuclear leucocytes as well as endothelial cells, about the trabeculae of the ligamentum pectinatum, filling up the spaces of Fontana and extending outwards to Schlemm's canal, which in parts was almost obliterated by them. These changes indicate an inflammation confined to this region, although the angle itself is free, and are the forerunners, Baquis thinks, of an attack of glaucoma. The explanation he offers as to the cause of this inflammatory infiltration is that it is due to the degeneration of the numerous intraocular hæmorrhages and the disappearance of the retinal tissue, whereby chemical products of an irritating character appear in the aqueous fluid: these products are carried to the angle of the chamber, where they set up an inflammatory reaction which slowly converts this open meshwork into solid parenchymatous or cicatricial tissue which makes the iris adhere to the cornea and thereby closes the angle and sets up glaucoma, a complication that actually occurred in a case of cyanosis retinæ recorded by Goldzieher.

THOS. SNOWBALL.

DUPUY-DUTEMPS. **Ophthalmoscopic Lesions in a Case of Family Amaurotic Idiocy.** *Annales d'Oculistique*, May, 1908.

EIGHTY cases of this condition have been previously recorded, and the chief points of interest which may be derived from the published reports are as follows:—

The onset usually occurs between the ages of four and six months. The symptoms of the disease are intellectual apathy, progressive muscular weakness, and failing vision owing to fundus lesions. Several children of the same family are commonly affected and not unfrequently other relations, such as nephews, cousins, etc. It appears to be a racial disease since the great majority of the cases quoted by Provotelle were either Russian or Polish Jews: (61 out of 68).

During the progress of the case, the mental apathy develops into idiocy and the muscular weakness into complete paralysis, while certain crises may appear, resembling epileptic attacks. The blindness also becomes complete and the child wastes, becomes marasmic, and eventually dies when two or three years old.

Warren Tay was the first to observe the changes in the fundus oculi. He described a white or bluish-white area occupying the macular region, in the centre of which was a dark red spot: seen usually at about the sixteenth month after the onset of the condition, and remaining without alteration until the fatal termination. In the later stages the optic papilla becomes pale and finally completely atrophic. The lesions were bilateral and symmetrical in nearly every case examined.

The case quoted by Dupuy-Dutemps brings out the salient symptoms: the patient was a child of eleven months, whose parents were Polish Jews. One brother, aged 7, was quite normal, but another died at the age of $2\frac{1}{2}$ years with similar symptoms. The child was quite healthy and well-developed up to the age of 3 months, when some mental deficiency and dull facial aspect began to be noticeable. There were also observed a vague look, drooping head and inertness of the limbs, the movements of which were rare and purposeless: the hands did not retain their grasp of objects placed in them. The thorax was small and formed a marked contrast to the adipose lower parts. Frequent crises of muscular spasms brought on by external stimuli appeared.

The fundi shewed symmetrical similar lesions in the yellow spot regions, viz., a circular white zone, similar in tint to an atropic disc but slightly larger in diameter, with its periphery rapidly merging into healthy fundus. At the centre was a dark red spot shewing up vividly against the white surroundings. The disc was normal, and the retinal vessels slender. The pupils were also normal in size, and reacted sluggishly to light.

The child was able to follow the movements of large objects but the ocular axes did not converge normally.

The pathological anatomy of the fundus condition and of the central nervous system, as described by Sachs, Peterson, Hirsch and Schaffer, and others, is as follows:—

Lesions are found throughout the whole extent of the cerebro-spinal axis, affecting the cells of the cerebral cortex, central ganglia and anterior horns of the spinal cord. These cells are found swollen and globular, with stelliform granules in the protoplasm, and a little later the nucleus becomes deformed and presents a spongy, pulped-up appearance.

The protoplasmic prolongations of the cells are similarly affected, and the fibrillæ appear dissociated owing to the disappearance of the interfibrillary substance. The medullated fibres of the brain and pyramidal tracts are diminished in number, but no changes are found in the cerebellum, Clarke's columns, neuroglia or vessels.

Although there is an analogy in the fundus condition to that seen in embolism of the central artery, this cannot be the cause since the retinal vessels are always found to be permeable. Nor is there any foundation for Mohr's explanation, that it is due to retinal oedema caused by an intermittent spasm of the vessels. One is forced to believe that so constant and permanent an ophthalmoscopic appearance can only be produced by permanent lesions of fixed elements of the retina such as have been found so constantly in the ganglion cells of the retina; and since these cells are more numerous in the region of the macula, "Tay's image" is readily explained. Finally the atrophy of the optic nerve which supervenes is no doubt secondary to this degeneration of the ganglion cells of the retina.

WILFRID ALLPORT.

E. LANDOLT. **Clinical Results of Muscular Advancement.**
Archives D'Ophthalmologie, May, 1908.

THIS paper is accompanied by an analysis of 22 cases which were operated upon by Landolt during the preceding 18 months.

In all these cases he performed an advancement, generally combined with the resection of a portion of the muscle advanced, and unaccompanied by any tenotomy of an opponent muscle.

The series includes cases of convergent and divergent concomitant strabismus, convergence insufficiency, and paralytic strabismus. In one case there was a divergence of 40° , following a tenotomy of the internal rectus for a convergent strabismus earlier in life.

The highest degree of squint operated upon was one of 45° of convergence.

Tenotomy is strongly opposed on the grounds that it produces an artificial paresis of the muscle, limitation of movement, diplopia (if binocular vision is present), and false projection; and it is also condemned on pathological grounds.

The bilateral nature of strabismus is also emphasised. It is pointed out that the action of a muscle, far from depending solely on its insertion, is controlled mainly by its innervation, and that the result of an operation for squint cannot be established with any certainty until the patient has had the use of his eyes for some time.

Professor Landolt's procedure is as follows:—

In a case of insufficiency a simple advancement is performed on one eye.

In a squint of low degree a simple advancement is performed on both eyes.

In a squint of high degree advancement, as a rule on both eyes, with resection, is indicated, but he does not pretend to estimate to a millimetre or so how far to advance the muscle or how much to resect. In fact the muscle is always attached as near the cornea as possible. The resection varies with the degree and nature of the squint, from a small resection of about 1 mm. or a medium resection of about 5 mm. to a large resection of over 5 mm., and an immediate marked over-correction is always aimed at. This over-correction, it is pointed out, can be safely made, as in adding to the power of a muscle

its opponent is not weakened and it is simply supplied with a reserve of force which the individual can use as his needs demand.

In tenotomy, on the other hand, a risk of under-correction or still worse over-correction is run, unless the operation is postponed until a time when it is impossible to get binocular vision; and moreover if this end be attained the individual is troubled with crossed diplopia in near vision, owing to the weakness of the adductors. It is maintained that if advancement, without tenotomy, is performed, it is justifiable to operate on quite young children. In paralytic cases we are saved long delay, for should non-operative treatment prove of no avail an advancement of the defective muscle may be undertaken; and should the muscle recover later, we do not get a squint in the opposite direction, as only the proportion of the increased power that is necessary to attain binocular vision is used. In tenotomising the opponent, on the other hand, we endeavour to remedy a weakened muscle by weakening its healthy opponent. In several of the cases the excursion of the eye after operation are recorded, and they shew satisfactory freedom of movement. There is no note of any enophthalmos being produced.

The paper is a plea for advancement, with or without a resection of a portion of the muscle, but emphatically without tenotomy.

The chief advantages claimed are that instead of weakening the muscle by tenotomy, we put at the disposal of the individual an increase of force, which will be regulated by the requirements of binocular vision, will be of advantage dynamically as well as statically, and will avoid many of the risks of faulty correction.

J. F. CUNNINGHAM.

LESSHAFT (Gorlitz). **Some Cases of Atropine Poisoning.**
Ophthalmologische Klinik, March, 1908.

IN the author's experience since 1886, as a result of the instillation of 0.5 to 1% atropine drops, three cases of undoubted atropine poisoning have occurred. The usual symptoms were present; the delirium, however, was most marked and had to be relieved by morphia. Two of the patients were children, aged 3 and 7 years, the third was a very delicate woman of

63. Link in 1883 described a similar case to the last but the symptoms were more severe: a decrepit woman of 67 suffered from poisoning after the instillation for only 5 days of a 1% solution of atropine.

In 1884 Feddersen reviewed 103 definite cases of atropine poisoning and found a mortality of 11.7%. The cases were all due to the alkaloid and usually resulted from collyria being taken by the mouth. The author has seen also two cases in which large doses of atropine were taken by the mouth. One patient, aged 11 years, swallowed 6 c.c. of a 0.8% solution and died, in spite of treatment, in about 8 hours. The second case caused considerable difficulty in diagnosis, as the patient, an hysterical girl of 22, denied having taken anything. She had had access in the consulting room of the author to several different forms of mydriatics.

As an aid to diagnosis Denme suggested that a drop of the patient's urine should be placed in the conjunctival sac of a cat: if the symptoms were due to atropine poisoning mydriasis should result.

In the author's case the stomach was washed out and after concentration a drop was placed in the eye of a cat: this produced marked mydriasis 45 minutes later.

Of the cases of atropine poisoning following the application of collyria to the eyes the one published by Burwenich in 1891 is the most interesting: a boy, aged 4 years, died as a result of 1.5% atropine drops being used to the eyes for 4 days only.

There is no doubt that if lamellae or atropine ointment were prescribed instead of collyria the danger of the drug being taken by the mouth would be avoided, and further, when exhibited in such a form, a much lower percentage of atropine is found to be efficacious.

E. W. BREWERTON.

DEHENNE AND BAILLIART (Paris). **Five Cases of Parinand's Conjunctivitis.** *Revue d'Ophthalmologie*, September, 1907, p. 537.

CASE I. A girl, aged 12, living at a farm where there was an epidemic of diphtheria amongst the poultry, had a typical attack of this disorder. It affected the right eye only, the lids were hard and swollen, there were gross vegetations of the conjunctiva with slight excretion, the cornea was intact, there

was adenitis of the præ-auricular, parotid and submaxillary glands and general fever. Treatment consisted in cleansing the conjunctiva by irrigation under pressure with $\frac{1}{10000}$ solution of cyanide of mercury, massage with 1 per cent. silver nitrate to the more swollen granulations; when there was pain in the eye drops of a 'very weak' solution of eserine salicylate were used. The cure was complete in four weeks.

CASE II. A boy of 12, also from a farm, had a similar attack in the left eye; the præ-auricular gland suppurated. The treatment was similar and the cure was complete in three weeks.

CASE III. A girl of 13, from the suburbs of Paris; she slept with her cat. The right eye affected; the cure was complete in three weeks.

CASE IV. An ostler, aged 51, suffered from an attack in the right eye; the cure was complete in four weeks.

CASE V. A lady of 25 who kept many little birds as pets. Her right eye was affected, and the cure was complete in a fortnight.

In case 4 alone is there any note of a bacteriological examination, and in that case only common yeasts were found.

The authors comment on the frequency of the attack in the right eye, the early onset of adenitis, the rarity of the attack extending to the second eye, or of the occurrence of relapses, or of infections of those in contact with the patient. They discuss at length the possibility of animal infection, but adopt a non-committal attitude since it has been pointed out that if this were a serious source of the disease it should be frequent amongst cavalry soldiers, which it is not. They suppose that the causative agent, whatever that may be, speedily penetrates the conjunctiva to reach the lymphatics, hence the lack of evidence of contagiousness and the severity of the adenitis.

The cases are interesting but they do not bring us any nearer to a knowledge of 'Parinaud's conjunctivitis.' A group of clinical symptoms may very well and usefully be known by this name, but so far no evidence has been brought that it is a definite clinical entity. The bacteriological evidence is vague, and if the suggestions of contact with animals are to be accorded serious consideration one wonders that the disease should be so extraordinarily rare.

N. BISHOP HARMAN.

Transactions of the Ophthalmological Society. Vol. 28., Fasc. ii. 1908. London: J. and A. Churchill.

THE Ophthalmological Society has adopted the plan of issuing the Transactions in three parts annually in place of the single bound volume (if that is so desired) and has thrown open the sale so that anyone interested specially in one or another of the papers published in one fasciculus can obtain that singly even though he may not be a member of the Society. The present part contains, besides other matter, two very interesting and really valuable papers, namely, one by Thomson Henderson upon the venous connections of Schlemm's canal, and one by Paton on optic neuritis in cerebral tumour. The former is an admirable piece of work embodying the results of much painstaking, skilful labour and involving a high degree of insight, knowledge and initiative. Henderson shows by means of serial sections that much of the accepted teaching upon the subject of the anatomy, normal and morbid, of the region of Schlemm's canal is founded on sandy supposition rather than on rocky fact, and must be seriously modified. This piece of work is in reality a continuation of his very valuable contributions to the pathology of the eye, particularly in relation to glaucoma.

Paton's paper is a record of much useful clinical work, consisting chiefly of deductions from the tabulated and classified results of long and repeated and careful observations. It is, however, open to all the faults of such a form of argument, for figures can be made to prove anything. It is curious to note in this connection that in his paper he states that when neuritis is unilateral, or, at least, worse in one eye than in the other, or earlier in onset in one eye than in the other, no conclusion, even approximately certain, can be drawn as to the side of the brain in which the tumour lies, while in the discussion both Horsley and Gowers directly traverse this statement on the strength of their observations on much the same cases in the same hospital at which Paton did his work. The paper is for all that one of much value, as is the carefully reported discussion also, in which a number of well-known neurologists took an important part.

There are two rather ridiculous printer's errors on pages 137 and 173.

JESSOP. *Ophthalmic Surgery and Medicine*. Second edition. 1908. London: J. and A. Churchill.

WE had the pleasure some time ago to report very favourably upon this book, which is dedicated to the students of St. Bartholomew's Hospital by their well-known lecturer on diseases of the eye.

The second edition is an improvement even on the first, and we have confidence in recommending it. There is a tendency in some text-books to waste space in recording rare conditions, but Mr. Jessop has successfully resisted such a temptation, and his work is by that fact so much the more practical and suitable for the students and busy practitioners who are likely to take their guidance from it. The number of illustrations has been increased, including, for the first time in Britain, reproductions of Prof. Dimmer's direct photographs of the fundus: while these, one must admit, may be more truthful than diagrams, it may, at least, be questioned whether they are so instructive. On the whole, the ordinary diagrams are very good, though a few might be criticised: for example, in fig. 92, the size of the lens is absurdly misleading. And we again draw attention with disapproval to the bad habit in so many text-books, and in this, of advertising one particular instrument maker in the diagrams. The practice is, we consider, decidedly improper.

N. B. HARMAN (London). *Aids to Ophthalmology*. Fourth edition. 1908. London: Baillière, Tindall & Cox.

THIS is a book originally written by Mr. Jonathan Hutchinson, junior, of which three editions have been used up. It has now been re-issued, and largely rewritten, by Mr. Harman, who has carried out his task with great skill. Several new chapters have been added, the letterpress carefully gone over. This has resulted in the addition of 68 pages: several entirely new chapters find a place in the little book, *e.g.*, those on external diseases, refraction, and the vision of school children. The book is a useful and a simple one, one of a series of "aids" in a number of branches of medicine and of science which has proved deservedly popular.

LE ROUX and RENAUD (Caen). A Case of Phototraumatism.

Archives d'Ophthalmologie, June, 1908.

THE subject was a healthy gendarme, who had had neither syphilis nor rheumatism. He was on night duty during a violent thunderstorm, and, after a particularly vivid flash, felt sharp pricklings in his eyes and a sensation as of a foreign body in the conjunctival sacs. Everything about him at the same time appeared red, and this condition persisted for some two hours. The distance of the flash is not stated: there was, however, no question of the current having traversed any part of his body, for he felt no shock.

After a few hours sleep he awoke with intense frontal headache. The next day the eyes became red and painful and all vision was abolished. The redness developed into a most acute conjunctivitis, with great chemosis, photophobia, and blepharospasm, but no secretion. The lids were red and swollen, the globes extremely tender.

During the following days the blindness remained complete, and ophthalmoscopic examination shewed that the fundus reflex was completely lost from diffuse opacity of the vitreous. The irides were congested, but the pupils could be dilated by atropine. There was slight interstitial opacity of the corneæ.

Gradually the acuteness of the inflammatory attack abated and the vitreous cleared somewhat, so that in two months time the vision of the right eye was $\frac{1}{3}$, of the left $\frac{1}{2}$; but there was still considerable photophobia. Even after a lapse of three years there remains some vitreous haze and the vision has not further improved. The optic discs and visual fields shewed no changes.

Cases of phototraumatism from the commercial sources of electricity are well-known, but of those due to lightning there appear to be few records. One such was reported in the *Ophthalmic Review*, 1907, p. 264. The vitreous opacity which was so marked a feature of the present case does not seem to have been observed in any previous instance.

W. G. L.

CLINICAL NOTES.

SOME OBSERVATIONS ON CATARACT EXTRACTION.—The details of the operation for cataract must be of perennial interest to all ophthalmic surgeons. The verdict of the tyro is that

"anyone can take out a cataract." Major Elliot, Superintendent of the Government Ophthalmic Hospital, Madras, after an experience of six or seven thousand operations, is only the more thoroughly convinced of how much there is to learn.

To begin with the preparation of the eye for operation, there is no doubt that the disaster of sepsis hangs more imminently over the patient in a climate like that of India than in our own; but it would seem that by taking sufficient care septic complications can be reduced to a percentage which would do credit to any European hospital. The method adopted is essentially that of Herbert, in which, some ten minutes before the operation, the everted lids are exposed to a stream of perchloride lotion, 1 in 3000; "the perchloride imprisons the organisms in the mucus, whose secretion it excites . . . all mucus and filmy exudation is removed by movement of the lids under a stream of saline fluid, and by a touch with gauze if necessary."

Major Elliot has added to this the swabbing out of the furthest recesses of the conjunctival sacs with sterile wool swabs, under a stream of boiled water, when the patient is on the table, and has good reason to be satisfied with the results of these precautions. He "holds most strongly that deep-seated inflammation of an eye after extraction is due to sepsis, and that to take any other view of the case is a mere 'burying of one's head in the sand.'"

A night's rest under a bandage is used to test the condition of the conjunctiva before operation, and any eyes shewing gummy secretion are relegated for treatment of this condition before operation. But if a case of conjunctival catarrh prove resistant to active treatment carried on for two or three months, he waits no longer, but operates as usual, and has not yet seen any untoward result from such a practice.

In the after-treatment of operative cases he has no doubt of the great value of argyrol (whatever may be its status as an antiseptic) in controlling the minor conjunctival inflammations to which the eye is liable after extraction, and even in suppurative keratitis and iritis has seen admirable results from the use of 25 per cent. solution. Protargol is less useful on account of the pain not infrequently attending its application and the consequent tendency to squeezing of the lids.

He has also, by repeated trial, convinced himself of the real

value of subconjunctival injections of normal saline solution in hastening the absorption of retained cortical masses and in clearing up any iritis which may be present. The injections are repeated twice a week until the pupil is clear.

Many other interesting and practical points are touched on in Major Elliot's paper. Among them we may mention a rare variety of corneal opacity after cataract extraction: it is often of ring-like form, and careful examination with a loupe never fails to shew a fine tag of capsule attached to the back of the cornea at the densest point of the opacity. Another point which is curious is that over 50 per cent. of the patients complained of blue vision after extraction of their cataracts, a fact for which no satisfactory reason has yet been adduced. The explanation that it is an effect of contrast, after removal of the yellow-tinted lens, is inadequate because in many of the cases the blue vision only comes on after some hours or days. The usually described erythropsia was only present in 2 or 3 per cent., and green or yellow vision in a still smaller number.—*The Indian Medical Gazette*, June, 1908.

MUSCLE-SPINDLES IN OCULAR MUSCLES.—At a recent meeting of the Neurological Section of the Royal Society of Medicine, Dr. Farquhar Buzzard brought forward this subject. He drew attention to the generally accepted statement that spindles are absent from the extrinsic muscles of the eye, and to the surprise occasioned by this statement in view of the high degree of co-ordination to which ocular movements attain, and of the important sensory function with which these spindles are credited. He showed photographs of sections of the ocular muscles in which spindles were easily recognisable. Dr. Buzzard's investigations (which he states are incomplete) lead him to the opinion that muscle-spindles are occasionally found in the ocular muscles in an easily recognisable form, and also that it is possible, or even probable, that a modified type of spindle may be usually present in these muscles. To the difficulty of detecting the modified and unusual form of spindle may be due the almost universal opinion that the ocular muscles are devoid of spindles. It is to be hoped that Dr. Buzzard's brief note on the subject will be followed by the results of his further investigations.—*Proc. Royal Soc. of Med.*, vol. 1, No. 8.

THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED
KINGDOM.

Meeting Friday, July 10th, 1908.

The President, Mr. MARCUS GUNN, in the chair.

CARD SPECIMENS.

1. *Pathological Sections of a case of Pseudoglioma.*—Mr. W. H. H. Jessop.
2. *Professor Dimmer's Photographs of the Fundus Oculi.*—Mr. W. H. H. Jessop.
1. *A New Ophthalmoscope, which was a modification of Morton's.*—Mr. P. C. Bardsley.
2. *A modification of the Moorfields Trial Frame.*—Mr. P. C. Bardsley.
3. *A Needle Holder.*—Mr. P. C. Bardsley.

PAPER.

The Visual Fields in Pigmentary Degeneration of the Retina.—Mr. M. L. Hepburn.

Lantern slides of visual fields were shown illustrating the different forms found in primary and secondary pigmentary degeneration of the retina. The former is met with clinically as retinitis pigmentosa and the latter is seen following chronic inflammatory disease of the choroid. The chief characteristics were pointed out, and indicated that a more or less definite type of field belonged to each variety.

The relationship of the visual field was discussed in regard to:—

1. The pigmentation present in the fundus.
2. The changes in the stroma and vessels of the choroid.
3. The retinal vessels.

The fields of vision demonstrated that the maximum defect in the primary degeneration was neither dependent on the amount of pigmentation nor on the severity of the choroidal disturbance, but upon the extent of interference with the flow of blood through the choriocapillaris; and moreover, although cases of chronic choroiditis exhibit their own special type of field, whenever the pathological changes were of such a nature as to involve the blood vessels, the type reverted to that found in primary degeneration.

On the whole the visual fields uphold the more generally recognised pathology of the cause of pigmentary degeneration of the retina, viz: spasm or sclerosis of the vessel walls.

It was also pointed out that there was some evidence to shew the possibility of the retinal circulation replacing the choroidal in the supply of the rods and cones, when the latter has been cut off by disease from maintaining the ordinary nutrition of that layer.

MALCOLM L. HEPBURN.

THE ADVANTAGES OF PARAFFIN AS AN EMBEDDING MATERIAL IN EYE PATHOLOGY.

By W. B. INGLIS POLLOCK,

Pathologist to the Glasgow Eye Infirmary.

It is now twelve years since the very valuable paper on the pathological examination of the eyeball¹ by Mr. Devereux Marshall appeared.

The methods there described are all good, but in summing up the relative advantages of paraffin and celloidin in the microscopic examination of the eye he concludes in favour of the latter, and assigns a comparatively small place to the paraffin method when embedding whole eyes. During the last two-and-a-half years I have relied entirely upon the paraffin method, and as recent writers² still advocate the celloidin embedding, it may be of interest to discuss the advantages of the former, and describe the details of the method which I employ.

The advantages of Paraffin.

i. It is claimed for celloidin that "it holds all the parts well together, so that there is no fear of getting them disturbed after cutting."¹ The same is true of paraffin: the method of fixing, however, is of the greatest importance in this respect, for if the lens and sclera are rendered too hard and brittle it may be impossible to obtain good sections. When the microscopical examination of the lens

1. *The Royal London Ophthalmic Hospital Reports*, vol. xiv.

2. Greeff. *Anleitung zur mikroskopischen Untersuchung des Auges*, 2nd edition, 1900.

Calderaro: "A method of obtaining serial sections of eyes embedded in celloidin." *La Clinica Oculistica*, January 1908. Abstract in *The Ophthalmoscope*, 1908, p. 426.

in eyes from patients over thirty years of age is not important, I am in the habit of removing the portion in the half eye used for sections in order to save the edge of the razors. This can either be done prior to the eye being placed in the paraffin bath or after the paraffin block has been placed in the microtome carrier. In the latter case the nucleus can be easily picked out by the point of a sharp knife without disturbing the lens capsule and the peripheral portions of the cortex. The sections after this procedure have simply an opening in the centre of the lens and can be treated in the usual way.

If the eye is kept too long in the paraffin bath a certain amount of distortion may occur. This always consists in a curling-in of the sides of the eyeball, whilst the cornea and optic nerve remain level in the trough thus formed. When such a block comes to be cut by the microtome the first sections simply contain the sides. The later sections, containing the cornea, ciliary body, and optic nerve with its surroundings, are then found to contain sclerotic, choroid, and retina, which are not at the equator but a little away from it. In the great majority of cases such a result is unimportant, but where it is desired to have a given point of the equatorial region included in the sections the eyeball should be bisected two to three millimetres to one side of it.

With regard to sections "being disturbed after cutting," it may be said that this is largely a matter of technique and gentleness of touch; but a method of avoiding all risk will be described later.

ii. The removal of the paraffin from the sections takes scarcely more than three minutes, and as it is carried out by simply placing the slide with the section in a tube of xylol no trouble is entailed.

iii. The manipulation of cut sections is a simple matter, even when they curl up.

iv. Paraffin sections can be kept for an indefinite period

between layers of paper on microscopic slide trays, while paraffin blocks are more easily stored in a permanent form than celloidin.

v. Paraffin sections may be cut of extreme thinness. In the case of the whole eyeball $8-14\mu$ is easily obtained. Sections of $6-12\mu$ are almost certain when the anterior segment is alone dealt with, including the entire cornea, iris, ciliary body and lens, and the anterior region of the sclerotic. The same is true of course for the posterior segment.

vi. Paraffin is unsurpassed by any other method for obtaining serial sections. Ribbons of sections can be produced at the rate of thirty to the minute and stored as rapidly.

The method of procedure.

After employing 5 per cent. formalin for a year I gave it up and the following mixture has been in use during the last twelve months. It is derived from one given by A. Bolles Lee.¹

PICRO-SUBLIMATE FORMALIN.

Mercuric chloride, 1 per cent. solution	44 parts.
Picric acid, saturated solution... ..	44 ..
Glacial acetic acid	10 ,,
Formalin	2 ,,

It has great penetrating power, and is of considerable rapidity of action. The nuclear stains are all well taken up, and there is a complete absence of fogging. The lens does not become too hard for paraffin sections. The disadvantage of this mixture is the opacity which it produces in the cornea and in albuminous fluids within the eyeball. The former prevents any examination of the interior of the

1. Lee, A. Bolles. *The Microtomeist's Vade-mecum*, 6th edition, 1905, p. 77.

eyeball until it is opened. The half eyeball kept for the museum has not this drawback, as the picric acid dissolves out if several changes of fluid are employed before the specimen is put up in permanent form. The opacity of the albuminous exudates is the same as that which results from formalin and alcohol.

The eyeball remains 24 hours in the fixing fluid and is transferred after a short washing to 30 per cent. alcohol. Adherent blood-clot should be removed at this stage. The globe is then passed through increasing strengths of alcohol at intervals of 24 hours until absolute alcohol is reached. I employ the following gradation: 30 per cent., 40 per cent., 50 per cent., 60 per cent., 70 per cent., 80 per cent., 90 per cent., and 95 per cent. When a rapid diagnosis is required the eyeball may be placed in 50 per cent. from the fixing fluid and advanced two stages in twenty-four hours. Small pieces of tumour, etc., are transferred direct to absolute alcohol.

The eyeball is bisected at the stage of absolute alcohol, according to the directions given by Marshall or Greeff, and while one half is laid aside for preservation, the other is placed for a second period of 24 hours in fresh absolute alcohol. The half eyeball, however, is first cut a second time to reduce it to a height of 5—8 mm. From the alcohol this slice is transferred to cedar wood oil for clearing. This is also taken in two stages of 24 hours each, fresh oil being used for the second; they may be shortened to 12 hours if necessary. I gave up xylol for clearing, as it renders the eyeball too brittle and the lens very hard. It causes, in addition, a certain amount of distortion, while the cedar-wood oil is free from these disadvantages. From the cedar-wood oil the specimen is transferred to paraffin. As a rule it is first put into a bath of used paraffin, then into pure paraffin, and blocked from a final change into pure paraffin. The tissue lies 12–24 hours in the paraffin oven. All traces of

cedar-wood oil must be removed, since its presence produces a white, friable block, which is useless for section-cutting. I employ Grüber's paraffin, best quality, of 45°C., and 52°C. melting point. The first is almost sufficient in winter time, but during the greater part of the year a mixture of the two is required. During the summer the 52°C is used alone, but in a recent sub-tropical heat-wave I had to add a little of 58°C. paraffin to it. The chief indication is to use a paraffin of as low a melting point as possible, and it must always be the best. Too soft a paraffin is indicated by the section collapsing during cutting: it is shown by the breadth of the sections being less than the breadth of the block.

The "Cambridge Rocking Microtome," 1900 pattern, is the best for small eyes, and small pieces of tumour for diagnosis. Comparatively large eyes may also be cut with this instrument when the sides of the block are reduced a little. This is done by shaving off a portion of the equator of the eyeball from one or the other side. When such a procedure is not advisable, and for large eyeballs, de Groot's microtome is convenient and not expensive. It gives gradation of the section-thickness in a somewhat similar manner to the "Rocking Microtome." The sections are absolutely flat, and in this respect are superior to those obtained from the other. I have not had the opportunity of comparing them with those from the large, flat-cutting Cambridge rocker. Ribbons can be easily obtained from all these instruments.

For mounting the sections I always use albumenised slides, and leave the sections 12—24 hours for drying. Thereafter the slides are placed in xylol for three to five minutes to remove the alcohol. After washing off the xylol with absolute alcohol a 5 per cent. solution of celloidin in equal parts of absolute alcohol and ether is poured over the slide, which is allowed to stand upright and dry in the air for a minute. This procedure makes

absolutely certain that the sections adhere to the slide; and by making it a routine practice trouble is saved in the future. The slide is then placed in 80 per cent. alcohol for two minutes and transferred to water. In order to remove the picric acid from the sections the slide is transferred to a 10 per cent. watery solution of potassium iodide for a few minutes until all the yellow colour is out of it. After being again washed in water the sections, which are firmly attached to the slide, are ready for any stain, if the tissue has not already been stained in bulk.

Dehydration is carried out by 80 per cent. followed by absolute alcohol; the sections are then cleared by passing through xylol, carbol xylol, or origan oil, and finally mounted in Canada balsam.

The half eye for preservation may be treated by any of the known methods. Personally I prefer the fluid preservatives, as portions of the tissue can be acquired if needed for subsequent examination, without any difficulty. The formula of the preservative fluid which I employ is:

Potassium acetate	...	...	...	...	90 grammes.
Glycerine	...	...	...	...	180 cc.
Formalin	...	...	...	...	20 cc.
Water	...	...	...	...	300 cc.

A very good account of the various methods of preparation is given by Casey Wood.¹

A considerable amount of practice is required before good results come with regularity. Details in the method are best learned from the general pathologist, and I have to acknowledge my indebtedness for many hints to Dr. John H. Teacher and Dr. Logan Taylor, assistants to Professor Robert Muir, of the Pathological Institute, Glasgow University.

1. Wood, Casey A. "The various methods of preparing and mounting gross eye preparations." *Journal of American Medical Association*, 1903.

REVIEWS.

FEHR (Berlin). A Case of Lymphangioma Cavernosum.
Centralblatt für Praktische Augenheilkunde, May, 1908.

CASES of lymphangioma cavernosum are sufficiently rare at any rate, and the good result obtained in the instance before us forms an additional reason for publication of it. Fehr's patient was a single woman of 45, who had always enjoyed good health. About a year and a half before she first consulted Fehr she had noticed a slight degree of protrusion of the right eye, which gradually became worse, and by and by the patient complained of some pain in the eye and in the head. She did not improve on the medicinal treatment first employed, and last autumn consulted Fehr for the first time. The condition then presented the three following important features:— (1) Exophthalmos to the extent of 12 mm., as measured by means of the ophthalmometer. Reading off the change in position required for the ophthalmometer as the normal and the protruded eye are successively examined enables one to estimate the amount of exophthalmos in one eye as compared with that of the other. In this instance the globe was protruded straight forward, and movements were retained unimpaired. (2) There was a considerable degree of hypermetropia, as compared with that present in the other eye. Vision of $\frac{5}{15}$ was present in the right eye on correction of 5 D of hypermetropia: in the left eye, which was emmetropic, vision was $\frac{5}{5}$. The field of vision was normal and diplopia could not be elicited. (3) There was, in the right eye only, a well-marked example of choked disc.

There could, therefore, be little doubt of the existence of an orbital tumour pushing forward the globe and flattening it posteriorly in such a way as to produce axial hypermetropia, at the same time compressing the main vessels. But of what nature the tumour might be it was not possible to be sure. A cyst was excluded, so far, by the absence of fluctuation: an angioma by the absence of pulsation, of involvement of the vessels of the lids and conjunctiva, and of increased exophthalmos on stooping: a periosteal sarcoma by the freedom of movement and the absence of diplopia. The facts that the protrusion was straight forward and that no muscles were paralysed spoke strongly for a growth within the cone of

muscles. Whether the neoplasm might be malignant or not was not certain; the long duration was at best but an uncertain indication; at all events the growth was causing pain, deformity, and grave danger to sight. It was decided, therefore, to proceed at once by Krönlein's method to open up the orbit, and remove the tumour if possible. This was conducted in the usual way and the examining finger at once encountered a firm elastic tumour about the size of a plum, which quite filled the space between the posterior face of the globe and the apex of the orbit. Fortunately, the optic nerve was only pushed aside by the growth; adhesions were very slight indeed so that the mass was turned out with no damage to the nerve and with almost no hæmorrhage at all. Healing was uninterrupted and rapid: in about 14 days the appearances of choked disc had died down, and even the paresis of the external rectus, which was due rather to stretching than to actual injury, gradually passed off.

On examination, the tumour proved to be, as stated in the title, a cavernous lymphangioma. The supporting tissue formed an open network, merging into the firm, complete capsule; elastic fibres were found only in immediate relation to the blood-vessels. Amid this multicellular structure was also a quantity of hyaline material, poor in cells, and firm in texture; there were no collections of adenoid tissue, lymph follicles, or masses of lymphocytes, such as have been observed in some other cases. The interstices in this network were lined with endothelium, and were of varying size, communicating with one another and containing—where they had any contents—coagulated lymph or even blood. Very few blood-vessels were to be found in the tumour tissue. In places here and there the tissue became more solid, and so crowded with cells as to suggest that we had to do with a transition between lymphangioma and lymphangio-sarcoma, and the preparations resemble closely those which in a similar case caused Hanseemann to draw special attention to the narrow and uncertain demarcation between benignancy and malignancy in such cases. Lymphangioma is among the rare tumours of this neighbourhood; only eight cases have been published hitherto; in some of these the tumour was encapsuled, as in this case; in others it was not. One may not unfairly conclude that those without capsule are more malignant than the others.

W. G. S.

AUBINEAU (Brest). **The Symptoms and Complications of the Ophthalmo-reaction for Tuberculosis.** *Annales d'Oculistique*, July, 1908.

T. HARRISON BUTLER (Coventry). **The Dangers of Calmette's Ophthalmo-reaction.** *British Medical Journal*, August 8, 1908.

N. BARNEY and ROGER BROOKE, jr. **The Ophthalmo-reaction to Tuberculin.** *Medical Record*, July 18, 1908.

IN view of the present somewhat doubtful position of Calmette's reaction these three recent papers are of interest.

In the first of them Aubineau points that although it is not yet possible to form definite conclusions about several aspects of this reaction, yet it is the duty of the ophthalmic surgeon to pronounce as to the safety of the procedure.

At first it was thought that the reaction set up in the eye was slight and transitory, but it soon became apparent that the eye had many ways of reacting, varying as much in the date of appearance and length of the reaction as in the intensity of the reactional symptoms.

He gives a clinical classification of the various degrees of the intensity of the reaction, pointing out that intensity and duration do not necessarily have any relation with each other.

The complications which have been met with are referred to; they include involvement of the uveal tract, the appearance on the bulbar conjunctiva or on the cornea of foci resembling localised pustular conjunctivitis or keratitis, nodules or patches of episcleritis, lesions resembling spring catarrh, intractable folliculosis, growths of the tarsal conjunctiva, and finally corneal ulceration. A large proportion of the cases in which complications have been met with are found to have had an ocular past.

Aubineau has had under his own observation 13 cases in which the reaction had been used in unsound eyes, and here gives a detailed account of 7 of these in which complications followed.

His series includes the following cases:—

Old corneal ulceration, 2 cases—both complicated.

Old phlyctenular keratitis, 8 cases—4 negative, 1 simple, 3 complicated.

Acute phlyctenular kerato-conjunctivitis, 1 case—complicated.

Probable tuberculosis of the conjunctiva, 1 case—complicated.

Choroiditis (probably tuberculous), 1 case—complicated.

In three of the complicated cases vision was permanently impaired, and in one ulceration of the cornea occurred which has persisted for 6 months in spite of treatment.

He considers a slight pre-existing conjunctivitis only of moment in that it may mask a reaction.

As regards the concentration of the solution Aubineau draws attention to the fact that there is a definite relation between the strength of the solution and the intensity of the reaction; that hypersensibility of the conjunctiva is produced by repeated reactions, and that this occurs in the other eye as well, so that an old lesion may be lighted up in an eye in which Tuberculin has not been used. There are two classes of unsound eyes in which the reaction is especially contra-indicated, viz., those manifesting ocular tuberculosis, and those which have been subject to corneal ulceration or phlyctenules. Aubineau throws out as a possible hypothesis that these latter cases are tuberculous in origin.

Dr. Butler's paper is a sequel to one which appeared in the *British Medical Journal* of April 18th, 1908.

In that paper Butler came to the conclusion that the reaction, though sometimes obtained in the non-tuberculous and sometimes not obtained in the certainly tuberculous, was a useful aid to diagnosis, and that if the eye used for the test was healthy no danger was to be feared from a tuberculin solution of $\frac{1}{2}$ per cent. to 1 per cent. The subsequent history, however, of three of the cases has been so unsatisfactory as to cause him to modify his original opinion.

In the first of these cases the reaction was followed by an intense conjunctivitis, and about a month later a phlyctenule formed near the corneo-scleral margin; this was succeeded by an interstitial keratitis and later by a central ulcer of the cornea. In the second, a strong reaction was succeeded by a very troublesome conjunctivitis, lasting nearly 3 months; and in the last case, a child, there occurred a violent muco-purulent conjunctivitis which became chronic and resisted all treatment until the weather permitted the boy to be out of doors all day.

In these cases the eyes were quite healthy before the test was applied. In all of them one drop of a one per cent. solution was used. In two of the cases one drop of a $\frac{1}{2}$ per cent. solution had previously been instilled with negative results.

His conclusions may be best stated in his own words: "Considering, therefore, that the test is often deceptive and may do grave damage to the eye (for my cases are only an addition to what is now a fairly long list) it seems hardly justifiable to use it any longer. I personally have abandoned the method, and am now employing injections of old tuberculin (P.G.) to help to decide the question as to whether a disease is or is not tuberculous in nature."

The third paper contains an analysis of 321 cases, 250 of which were tuberculous subjects.

The investigations were made in the U.S. Army General Hospital at Fort Bayard. The investigation of this large series of cases was carried out under very favourable conditions. The patients were in the large majority of cases under constant observation, and the presence of bacilli in the sputum, temperature, etc., were carefully noted.

Only one patient had previously had an injection of Tuberculin, and tubercle bacilli had been present in the sputum six months previously; the reaction in this case was negative.

In negative cases the other eye was tested at a later period. The symptoms in positive cases usually began in six hours with slight burning and smarting at the inner canthus, in eighteen hours there was redness and slight swelling of the conjunctiva, mainly in the region of the caruncle, accompanied by increased secretion. Forty-two hours after the instillation the reaction was beginning to disappear. Most of the reactions had disappeared by the morning of the 4th day after instillation.

No reaction appeared later than 36 hours after instillation, and no undoubted reaction disappeared within 24 hours, in most of the cases the reaction had practically disappeared in 56 hours after the instillation. No reaction lasted longer than 4 days.

The subjective symptoms (which were sometimes absent) were most usually, "a gummy feeling, a feeling as of a foreign body, slight burning and soreness. The most constant objective signs were, in the order of their frequency, gumming, increased secretion, swelling of the semilunar fold of the con-

junctiva, and redness. Redness was not invariable." The severity of the reaction was found to be roughly proportionate to its duration. The time of appearance and the severity of the reaction were in no way related, and there was no obvious relation between the severity of the reaction and the severity of the pulmonary symptoms.

The secretion was watery and mucous, in some cases probably serous, but in no case purulent. In two cases there was slight œdema of the lids, in one case there was a minute ecchymosis which disappeared within 36 hours, and in another "slight fugitive circum-corneal congestion."

They have classified their results on a modification of Turban's scheme, and the percentage of cases in which reactions were obtained may be thus briefly summarised.

Tuberculous cases.—Active				97 to 98 per cent.
Inactive but not arrested				75 „
Arrested				40 „
Apparently cured				23 „
Suspects and non-suspects				17 „
Non-suspects				10 „

The authors are not inclined to attach any prognostic value to the test as they applied it.

From a diagnostic standpoint the reaction is considered to be on a par with the Widal test for typhoid, and as more certain to be obtained in active cases of tuberculosis than are bacilli. In every positive case, however, we are not justified in concluding that the patient is suffering from tuberculosis. In negative cases, the chances are 97 to 100 against active tuberculosis being present. The chief value of the test is in the diagnosis of early phthisis before bacilli are present in the sputum, and in localised tuberculous lesions.

The authors "have seen no bad after-effects," and would probably have done so had any occurred, as nearly all the cases remained under observation. In view of this satisfactory result it may be worth while to give in detail the mode of preparation of the tuberculin and the dosage employed, to both of which the authors evidently attach great importance. The solution is prepared as follows: "To bouillon prepared in the classical way, except that $\frac{1}{2}$ per cent. acid potassium phosphate is used in place of salt and neutralized with sodium hydrate

to acid plus one, 7 per cent. of glycerin is added. A six weeks' old culture of tubercle bacilli from human sources in this medium is boiled for an hour and a half, filtered through paper, evaporated to $\frac{3}{10}$ of its volume, and re-filtered. $\frac{2}{10}$ of glycerin and $\frac{5}{10}$ of a $1\frac{1}{2}$ per cent. carbolic acid solution are then added, bringing the liquid up to its original volume. The test solution for the eye was prepared by precipitating the tuberculin with a large excess of 95 per cent. alcohol, washing the precipitate with absolute alcohol, then with ether, and drying over a spirit lamp. A 1 per cent. and a $\frac{1}{2}$ per cent. solution by weight of the dry precipitate in sterile normal salt solution were then made, put in sterile bottles, and put into a steam sterilizer for one hour." Strict precautions were taken against bacterial contamination of the solution, and bottles that had been opened were re-sterilized from time to time, without apparent loss of efficiency. They employed a single measured drop of the 1 per cent. solution prepared as above in the following manner: for applying the drop to the eye glass tubes were drawn out to points of various calibres, and that tube used which gave 200 drops in filling a 5 c.c. measure, each drop being thus taken to be 25 milligrammes. If the patient squeezed out the drop, or if a rapid flow of tears washed it away, the cases were noted, and if reaction did not occur, were tested in the other eye. For fear of the dangers of anaphylaxis no patient was re-tested in the same eye.

J. F. CUNNINGHAM.

STILLING (Strasburg) and H. LANDOLT. **On the Relation of the Light Sense to the Refraction of the Eye.** *Klinische Monatsblätter für Augenheilkunde*, May, 1908.

THIS article is taken up mainly with a criticism of Seggel's findings regarding the state of the light sense in high myopia. In 1904 Seggel published the results of an extensive series of observations on the light sense in myopia. His conclusion was that myopia was usually accompanied by considerable diminution of the light sense. Professor Stilling, on testing a number of myopes, was surprised to find that his results did not at all correspond with what Seggel described. He therefore set himself to investigate the subject more fully. Seggel's deductions were challenged and this observer, after a fresh series of tests, again maintained that his original view regarding

the damaging effect of myopia on the light sense remained unshaken. Stilling, with the aid of certain colleagues in his clinic, then made an extensive clinical research in the subject. On the whole 374 myopes and 100 others, chiefly hypermetropes, were tested as to the light sense, mainly by Seggel's own method, which Stilling considers a convenient and trustworthy, if somewhat rough, clinical test for alteration in the light sense.

The first series of cases tabulated by Stilling consists of 185 myopes, up to 8 D, but without pathological changes in the fundi. In not one of these cases was the light sense found under the normal; in the majority indeed it was above the normal as given by Seggel's table. Thinking that Seggel had possibly placed the normal too low, Stilling now tested 100 hypermetropes, but found little difference in the results, the finding being that the myopes had rather better light sense than the hypermetropes. Stilling concludes, therefore, that simple myopia has no deleterious effect on the light sense. Even in cases where the visual acuteness was as low as $\frac{1}{3}$ by Snellen's scale, he did not find the light sense damaged.

Finally, Stilling tabulates 51 cases of high myopia (9 D and over). Of these cases 37 shewed severe pathological changes in the fundi; only 12 of them shewed a diminution of the light sense. Stilling expresses surprise that in cases of this sort with gross retinal and choroidal disturbances he did not find the light sense more frequently affected. He thinks that this observation goes to prove that loss of visual acuteness in high myopia depends entirely on retinal and choroidal changes and not on any interference with the nerve fibres by the formation of a conus.

In the concluding part of his paper, Stilling gives an account of a large number of control observations. These consisted in testing the visual acuteness for light of different colours (red and blue). The results shewed that the central perception of red and blue was unaffected in myopes. Only in cases with severe fundus changes was there diminution for coloured light.

By certain of his colleagues other tests were also used. The results all bore out Prof. Stilling's view that the light sense is in no way related to the state of the refraction. Further research on the subject appears to be called for.

J. V. PATERSON.

MORAX and CARLOTTI. **Sporotrichosis of the Eyelids.** *Annales d'Oculistique*, June, 1908.

MORE than one member of the family of hyphomycetes, or moulds, is now known as capable of developing in the living tissues of man: the ray fungus, for example, has long been recognised as a possible human parasite. It is now ten years since Schenk first isolated, from a case of multiple subcutaneous abscesses, an organism which he recognised as belonging to the class known to botanists as sporotrices. In 1900 a similar case was reported by two American observers. Later, de Beurmann, in France, has carefully investigated and described a fairly long series of cases of this nature, and it is to his monographs that we owe most of our knowledge of what is still a very rare affection.

Several clinical varieties are known: the lymphangitic, in which, after an incubation of one to three months, there appears in the region of some superficial wound a cutaneous abscess, and this is rapidly followed by nodules along the course of neighbouring lymphatic trunks; the multiple disseminated subcutaneous abscess; the dermic or epidermic infiltration without involvement of lymphatics; and, lastly, that in which the lesion occurs on a mucous surface.

The case here reported by Morax and Carloti belonged clearly to the first of the types above mentioned, and had its point of origin in the free border of the eyelid.

A man of 70, apparently in good health, except for a certain degree of anæmia and a tendency to acne about the nose and forehead, presented the following condition of his left eye. The upper lid in its whole length was moderately swollen to a distance of 6 or 7 mm. from the free border, the swelling having a purplish tint: along the upper margin of the swelling, and included within it, ran a curved line of small, yellowish elevations indicating the situation of subcutaneous abscesses; among the roots of the lashes were crusts of dried exudation covering several small longitudinal ulcers. The most peculiar feature was a lymphatic trunk, as big as a pipe-stem, which ran from the outer palpebral commissure in a sinuous course towards the pre-auricular and sub-maxillary glands. The skin over it was slightly rosy and at one point shewed the yellowish tint of a focus of suppuration. The pre-auricular gland was the size of a large almond; that on the angle of the jaw was

nearly as large and was adherent to the bone; the sub-maxillary gland was slightly affected.

Another peculiarity of the affection was the apparent indifference of the tissues towards their uninvited guests; of pain there was none; the only symptoms complained of were slight tenderness on pressure and slight drooping of the upper lid. The condition had been present without much change for several weeks. No history of injury was obtained.

Smears were taken, with due precautions, from the ulcers, and pus was drawn by a capillary tube from one of the abscesses; these were stained by dilute fuchsin, by the method of Giemsa and by the method of Gram; no evidence whatever of the presence of micro-organisms was obtained by any of these methods, and the result was the same on repeated trials.

The case was different when cultural methods were employed. After three days in the stove at a temperature of 36°C., and within a day and a half at the temperature of the room, colonies appeared in abundance on the culture media, white at first, but, as they grew and thickened, becoming brownish or chocolate-coloured. The medium on which they grew most easily were glycerinated carrot.

Under the microscope these growths were found to consist of ramifying mycelial tubules, septate, with branchlets coming off at right angles bearing clumps or rosettes of ovoid grains at their extremities, the conidia or fructification of the mould.

Inoculation experiments gave a cutaneous ulcerative lesion in mice and rabbits, from which characteristic spore forms could be obtained, while, in guinea pigs, no effect followed.

As soon as the presence of sporothrix was demonstrated the patient was given iodide of potassium in doses of 2 grammes per diem (subsequently raised to 3) without any local treatment being employed. Four days later he returned with the lesions manifestly improved. The lymphatic cord was still present, but when punctured and the contents inoculated on culture media the only growth obtained was one of staphylococci; it seemed that the pathogenic parasite has already succumbed under the influence of the iodine and that the staphylococci had developed secondarily in its place. In three weeks the ulcers were healed and the glands were mobile and half their former size; and before long the cure was complete.

The outward aspect of the lesions might have raised the question of syphilis or tubercle, although there was none of

the thickening and induration associated with the former, none of the undermining of the skin, the large, pale granulations of the latter; the result of the bacteriological examination however was unequivocal, and led the way to the speedy cure of an affection which might otherwise have proved disastrous.

W. G. L.

WIDMARK. **Three Cases of Toxic Amblyopia of Unusual Origin.** *Communications from the Eye Clinic of the Medico-Chirurgical Institute, Stockholm.* Part ix. Jena: G. Fischer, 1908.

It is in accordance with general experience to say that tobacco and alcohol constitute the most frequent and important causes of toxic amblyopia, an affection that is characterised by considerable impairment of vision, central or paracentral colour scotoma, normal fields peripherally, with pallor of the temporal half of the optic disc in the more advanced stages. There are other poisons, however, which in rare instances produce the same clinical picture: and Widmark records here two such cases where the disease was due to the excessive use of coffee.

His first case was that of a married woman, 32 years of age, who complained that her sight had been failing for five months. She was very thin and her face was of an ashen-gray tint. There was neither sugar nor albumin in the urine. An examination of her eyes shewed slight pallor of the outer part of the discs, visual fields of full extent or only very slightly contracted peripherally, and well-marked central scotomata for red with a small spot of absolute scotomata in each. The patient denied ever taking either alcohol or tobacco, but admitted that she drank a great deal of coffee, in fact almost "lived on coffee." Widmark thought it hardly likely that this could be the cause, and put her on iodide of potash, under which she showed in three weeks some improvement in her vision. On her discharge from the hospital she returned to her old habits. Her sight and general health became so bad that she went to reside near the sea and there lived principally on a milk and fish diet, drinking only two cups of coffee daily. With this change the patient improved again and on the last examination her sight was much better. She could read Jaeger 1, and the scotoma for red had disappeared.

From this case Widmark was inclined to class excessive coffee-drinking with carbon bisulphide, iodoform, etc., among the rarer causes of this form of amblyopia, especially since two cases of this kind, due to the immoderate drinking of tea, have been recorded; and his suspicions were fortified by a second case which came under his observation. This was a woman of 45 who gave a history of long-continued weakness, loss of appetite, frequently recurring severe pain in the region of the stomach, periodic pain in her left eye with hemicrania, and for some weeks loss of sight. On examination it was found that the retinal veins were slightly congested, and the fundus presented a reflex slightly greyer than the usual bright red appearance; the fields were normal at the periphery, while at the centre there was a scotoma for red, slight in the one eye, well-marked and of typical form in the other. To an enquiry about the use of alcohol the patient gave an emphatic denial; she had on a very few occasions tried smoking to alleviate her attacks of gastric pain. On the other hand she admitted drinking coffee to a quite immoderate degree. For the purposes of control she was taken into the hospital and put on a mixture containing nux vomica and a bitter infusion, coffee being entirely forbidden. She made a speedy recovery: in ten days her sight had practically returned to normal, and the scotoma was no longer detectable.

Little, if anything, can be found in the more recent literature regarding the effect of excessive coffee-drinking on the eye. Widmark cites two cases recorded by Bulson (*American Journ. of Ophthalmology*, 1905), but, judging from the notes that are given of them, he rightly criticises them as not true cases of toxic amblyopia.

The etiology of the third case is, perhaps, not quite so certain. The patient, a woman 34 years old, complained of considerable loss of sight within a week: her optic discs showed perhaps slight pallor, and in one eye there was a distinct central scotoma for red. No definite cause for this condition could be found, but she was advised to stop work and given iodide of potash, and with this and subsequent mercurial inunction her sight and general health were completely restored. She returned to work after a few months, but her health began to fail (although her sight remained normal) and again a course of mercury was prescribed. Two years later the patient again complained of lassitude and general weakness

until she was compelled to give up work. Thinking there might be something in the room where she worked which might account for her condition she had it examined and the wall paper was found to contain arsenic in considerable quantity.

Although the patient did well under "antisyphilitic" treatment there was no history of lues and Widmark considers that arsenic may well have been the cause, especially as this drug has been known to produce slight optic neuritis, and, in Liebrecht's well authenticated case, the usual signs of toxic amblyopia.

THOS. SNOWBALL.

WIDMARK. **On the Treatment of Sympathetic Ophthalmia by Sodium Salicylate.** *Communications from the Eye Clinic of the Medico-Chirurgical Institute, Stockholm.* Part ix. G. Fischer, Jena, 1908.

IN Part 6 of these communications (1904) Lindahl reported the results of thirteen cases of sympathetic ophthalmia occurring in the *clinique* of Widmark (cf. *Ophthalmic Review*, 1904, p. 213). It may suffice to recall that the first six cases had in addition to local treatment a course of mercurial inunctions. The results were extremely unsatisfactory. The remaining seven cases were given a course of sodium salicylate of 60 to 90 grains per day. They were less severe cases, and the results were extremely good in the majority. To these cases Widmark now adds five, in which the salicylate treatment has been employed.

The first, a boy of five years of age, was having 30 grains of the salicylate daily on account of the inflammation in the injured eye, and the iritis had apparently completely subsided when sympathetic irido-cyclitis occurred. It ran a moderately severe course. The salicylate was doubled, and later replaced by aspirin. The vision on dismissal had reached 0.5. The second case was a boy of six years and with him sympathetic neuro-retinitis began five days after enucleation of the injured eye, the onset being accompanied by a slight rise of temperature. The inflammation rapidly subsided, and on dismissal vision was 0.8. The third, a lad of nineteen, had gonorrhœal ophthalmia, which went on to perforation of the cornea, and prolapse of the iris. Dismissed after the eye had become quiet, he returned with sympathetic irido-cyclitis of the sound

eye. In spite of enucleation of the former, and considerable doses of salicylate, followed later by a course of mercury, the vision of the sympathising eye became extremely poor. The following somewhat curious summary of the subsequent history of the case is given: "Striking improvement during a three weeks' course of 8-9 grammes (120 to 140 grains) of sodium salicylate per day. The eye almost without irritation, vision 1/60. After dismissal, gradual development of atrophía bulbi with cataracta accreta." In the fourth case, a boy of twelve, sympathetic iridocyclitis likewise ran an extremely severe course and left the sympathising eye with vision 1/60. The last was a mild case of sympathetic retino-chorioiditis, which showed no improvement until the treatment by sodium salicylate was replaced by a course of mercury.

After reviewing the twelve cases (viz., the last seven of the first series and the five of the present paper) the author claims eight good results from the employment of sodium salicylate, and two from the course of mercury. These ten cases give 83% of cures compared with the 14% of Schirmer, 10% of Fuchs, and 23% of Steindorff quoted by the author, and all published about 1905.

Examining, however, the cases more closely, No. III. on dismissal had only vision of 0.15 (approximately 6/40), which was lost altogether as the result of detachment of the retina. As it is probable that the separation of the retina was due to connective tissue bands left by the irido-cyclitis the result should not be claimed as good. Of the other good results three were cases of retino-chorioiditis, and in two the sympathetic inflammation was mild. Excluding these three cases and taking No. III. as unsuccessful the total number of good results or cures is six in nine cases of sympathetic iridocyclitis, or 66%. Among the last five cases, *i.e.*, the new series, two were inflammations of the fundus, and there was only one good result among three cases of irido-cyclitis, or 33%.

W. B. INGLIS POLLOCK.

WIDMARK. **A Case of Bilateral Detachment of the Retina with Complete Cure.** *Communications from the Eye Clinic of the Medico-Chirurgical Institute, Stockholm.* Part ix. Jena: G. Fischer, 1908.

THIS case is a noteworthy one not only because of the results obtained but also on account of its origin.

The patient was a lady, 62 years of age, who, when seen for the first time, gave a history of fever, marked swelling of her eyelids, protrusion of her eyes, and considerable diminution in her sight some six weeks previously; this attack had passed off after a few days, but was followed by several attacks with similar symptoms and subsequent improvement.

On examination it was noted that both eyes exhibited slight exophthalmos, while the movement of the external ocular muscles was unimpaired; the lower part of the conjunctiva bulbi on both sides was slightly injected and moderately chemosed; the pupils were small but reacted to light; vision varied from $\cdot 6$ to $\cdot 3$; H. 1.5 D. Ophthalmoscopically there was seen detachment of the retina below, and over the fundus (particularly over the lower half) were scattered numerous small pigment-spots that seemed to lie in the retina; there was no sign of a rent in the retina; the fields of vision showed at their upper periphery a moderate degree of contraction.

These symptoms, combined with such a history, pointed to some inflammation in the orbit, and the fact that both orbits were similarly affected suggested some disease of the nose and its accessory sinuses. A week afterwards the patient had another attack, when the left eye began to show very marked swelling of the lids and exophthalmos and an increase in the size of the retinal detachment. The signs pointed to a commencing orbital abscess and led the author to make an incision into the orbit; but the result was negative. The suspicion of orbital abscess was subsequently confirmed by the statement of a colleague who informed Widmark that two years before he had treated the patient for retro-nasal catarrh, polypoid degeneration of the mucous membrane over the middle turbinal and ethmoidal bones, and empyema of the maxillary sinuses; and thought it not unlikely that the lamina papyracea had been injured at the time of the removal of the polypi.

The patient was now put under appropriate treatment for the disease in her nose, with the result that the condition in the orbits very quickly improved and the detachment of the retina grew less. In twelve days the detachment in the right eye had disappeared and the vision rose to $\cdot 9$, while that in the left had also become completely replaced within a month.

A slight recurrence of the symptoms appeared subsequently, but without any sign of detachment of the retina. The patient was seen again after four months, when it was found that the

fields were normal, the retinae were in perfect position, but the numerous pigment-spots over the fundus were still present.

Widmark comments on the rarity of orbital inflammation as a cause of retinal detachment and quotes two cases previously recorded by v. Graefe and Berlin. In all three the detachment of the retina quickly disappeared after evacuation of the orbital abscess. From these results he infers that the prognosis of detachment from this cause is very good as compared with that of the more common form; it is probable indeed that the fluid beneath the retina is a serous exudation similar in character to the oedema which accompanies abscess formation elsewhere. Leber had put forward the suggestion that in those cases of so-called retinal detachment which cleared up quickly after the evacuation of an abscess there was no real detachment, but that this condition was only simulated by the in-pushing of the coats of the eye, as is known to occur with orbital tumours. Such an idea, however, Widmark rejects as being out of the question in this case.

THOS. SNOWBALL.

MURRAY (Minneapolis). **Optic Neuritis due to Chronic Emyema of the Frontal and Anterior Ethmoidal Sinuses.**
Ophthalmic Record, April, 1908.

THE author brings forward further evidence of the frequency with which optic neuritis is caused by affections of the nasal accessory sinuses. He refers to several cases of his own and of other investigators (Fish, Coppez, Brawley, Richet, Würdemann) in which immediate subsidence of symptoms followed the draining or opening out of the affected cells or sinuses. One case under his own care of a year's duration cleared up entirely in ten days after freely draining the frontal and anterior ethmoidal sinuses—the symptoms, including intense headache, vomiting and vertigo, disappeared—and the vision improved from $\frac{1}{5}$ to normal. In the other cases referred to the operations were followed by improvement of vision from $\frac{1}{20}$ to normal in eight days, from $\frac{1}{5}$ to normal in four days, from being totally blind to normal, and from $\frac{6}{60}$ to normal, each within a few days. From his own experience and the investigations of others, particularly Onodi and Schroeder, the following facts are elicited:—that the sphenoidal and posterior

ethmoidal cells are those most frequently associated with the ophthalmic lesion: that the optic canal is sometimes in close proximity with these sinuses, which latter are very irregular in their conformation: sometimes there is only a bony septum the thickness of paper between the canal and the air cells: occasionally there are defects even in this septum, so that the mucous membrane of the sinus is in actual contact with the nerve sheath.

CHARLES BLAIR.

FORSMARK. A Case of Bilateral Symmetrical Epibulbar Leukosarcoma. *Communications from the Eye Clinic of the Medico-Chirurgical Institute, Stockholm.* Part ix. 1908.

FORSMARK'S case was a man sixty-two years of age. He had observed for a year a fleshy nodule on the upper outer aspect of his left eyeball, causing some protrusion of the upper lid. Vision had been deteriorating, but there was no pain or tenderness. At the time of observation the left upper lid was seen to be pushed forward, by a tumour so situated upon the upper half of the globe that its lower or anterior border embraced the upper edge of the cornea from the outer to the inner end of its horizontal meridian. This free border was the thickest part of the tumour and had a thickness of 4 or 5 millimetres. Its thickness gradually diminished in an upward direction, and the posterior border could not be defined as it lay farther back than the upper fornix. The colour of the swelling was of a yellowish brown, its surface smooth, and its appearance translucent and "bacon-like." It felt elastic and quite fixed to the sclera. There was no tenderness on handling. The cornea was clear, with a moderate amount of regular astigmatism. Media, fundus and field of vision normal. Corrected vision = 0.7. In addition to the protrusion of the eyelid there was a certain degree of protrusion of the globe itself. A similar tumour was discovered on raising the upper lid of the right eye, but this was much smaller than the one on the left eye. Corrected vision of right eye = 1. A small preauricular gland was palpable on the left side but none on the right. Portions of the tumours excised for microscopic examination showed no organisms. In structure the tissue was highly cellular, the cells being chiefly small round or oval cells with well stained nucleus. Among these, much fewer in number

but 2 or 3 times as large, were oval or round cells with clear protoplasm and a large clear nucleus. Some of these were larger than the others and contained as many as six or seven nuclei. There were a few Ehrlich mast cells but no plasma cells and no vacuolated cells. Some pigment was found giving the iron reaction. The only connective tissue was in the form of fine septa passing out for a very short distance from the blood vessels. Sections from the tumour of the left eye (presumably the older) showed great thickening of the adventitia of the blood vessels, and the much contracted lumen filled with proliferating endothelial cells. The fine septa of connective tissue were also thickened. The contraction of these had led to the appearance, in parts, of thickened vessels and connective tissue septa crowded together, in the interstices of which were the degenerated remains of tumour cells. The tumour tissue was for the most part separated from the conjunctiva by a layer of connective tissue, but here and there it reached quite up to the epithelium.

The author mentions a number of conditions which must be taken into account in making the diagnosis, and discusses in detail the points for and against unpigmented nævus, epithelioma, lymphoma, amyloid degeneration of the conjunctiva, and the granulation tumours of syphilis, tubercle and lepra. Having eliminated all these, he falls back on a diagnosis of primary, bilateral, epibulbar leuco-sarcoma. The prominence of the left eye he attributes to the existence of a third tumour in the left orbit.

The patient was treated with potassium iodide and mercury, and later with arsenic, but with no result in either case. Finally the tumour on the left eye was removed piecemeal and the wound healed normally. The author is prepared, however, to hear of recurrence, and cannot propose any treatment beyond partial excisions to relieve local symptoms.

ARTHUR J. BALLANTYNE.

COSMETTATOS (Athens). **Three Cases of Microphthalmos.**
Annales d'Oculistique, May, 1908.

CASE I. A. C., æt. 23. The lids of the left eye were noticed to be smaller than those of the right, and appeared to be flattened. The left eyeball was only half the normal size, the cornea was very small but transparent, the iris was blue, with a coloboma in the lower part, oval in form, measuring 3 mm

by 1.5 mm and extending from the pupillary border to the base. No pupil reaction could be obtained, and no vision. The lens was small, white and shrivelled.

The condition was present at birth. There was no other deformity, nor any family history of a similar condition of the eyes. The right eye was normal.

CASE II. P. M., æt. 30. The left lids were retracted and the globe was represented by a small spherical mass about the size of a pea, red in colour, and movable to a certain extent by the ocular muscles. At the inner canthus there was a fold of fibrous conjunctiva directed towards the atrophied globe to which it was closely attached.

In this case there was no other deformity and no family history of the condition.

CASE III. A newly-born infant with several malformations, viz., hare-lip and double microphthalmos. The head measurements were normal—the placenta was healthy. The child died in $4\frac{1}{2}$ days, and at the autopsy was found to have a bicornual uterus and double vagina. There were seven previous healthy children, and no parental malformations or syphilis.

The right lids were closed, the lower jutting out in front of the upper. Palpebral aperture = 10 mm. The eyeball was represented by a small red sphere whose antero-posterior axis was 10 mm, vertical 8 mm. The cornea was very small and opaque, the optic nerve and muscles were present.

A microscopic examination was made of this eye and the following points were noted:—

The lids were thicker than normal, the orbicularis muscle was present, but no tarsal plate could be seen.

Meibomian glands were found, surrounded by dense fibrous tissue. Their acini in many cases shewed cystic dilatations ranging from 35 to 220 μ in diameter: these cysts were lined with several layers of cubical cells similar to gland cells. The excretory canals of the glands were for the most part normal, but here and there greatly distended.

The cornea was 5 mm. in diameter and 1 mm. thick. Its anterior epithelial layer was present, as were also Bowman's and Descemet's membranes. The parenchyma was composed of wavy fibres with interstices containing lymph cells, the latter being more numerous near the limbus. Capillaries were also to be seen in the corneal tissue. In the peripheral portion of

the cornea, near the external canthus, was a large fibro-cartilaginous mass which penetrated into the corneal substance.

The anterior chamber was very shallow, and contained masses of an amorphous granular material.

There was no trace of the canal of Schlemm.

The Iris in the upper part was reflected backwards and attached to the lens, and at the part where the coloboma was present fibrous bands coming from the angle of the anterior chamber were seen passing over the ciliary body to become attached to the inferior surface of the lens.

The ciliary muscle was absent and the ciliary processes were represented by an irregular pigmented mass.

The Lens was comparatively large, 6 mm. \times 10 mm. Its anterior surface was covered by a thin layer of connective tissue, its posterior being in contact with the folds of retina, and shewing here and there pigmented masses.

The lens fibres were distinguishable only at the periphery, in the centre they were transformed into an amorphous mass with fat globules and crystals.

The Retina filled nearly all the vitreous cavity and lay in many folds, most numerous near the lens. In the upper part of the globe the retina lined the choroid as far as the ciliary body where it was folded back on itself and after forming many plications ended on the posterior surface of the lens. In the lower part it started as a small mass under the optic nerve, and thence covered the choroid with numerous folds.

The different layers could be made out in most parts except near the lens, where the retinal tissue appeared as large masses, in which several rounded or oval bodies were seen. These consisted of a central space surrounded by a layer of rods and cones bearing fine cilia, and around this layer a mass of cells with large nuclei. These structures resembled the "rosettes" found in glioma of the retina.

The Vitreous was much reduced in volume and shewed a fibrillary structure, but contained no blood vessels.

The Optic Nerve contained normal fibres and was 2 mm. in diameter. In the sections through the cornea, the posterior part of this membrane was seen to be infiltrated with white globules and invaded by a large pigmented mass evidently derived from the ciliary body.

In other sections a mass of fibrous tissue was noticed running from the vitreous cavity into the cornea where it blended

with the corneal fibres. This tissue contained three cartilaginous points.

The explanation of these various observations is probably as follows:—

The formation of cysts in the lid glands is due partly to their crowding together and partly to the pressure of Riolan's muscle.

The appearance of the cornea suggests in the author's opinion that an intra-uterine keratitis had taken place: Terrien and v. Hippel have found in addition in some cases patches of corneal ulceration. But others regard such a condition of the cornea as is here described merely as the result of an arrest of development.

The eversion of the iris has been described by Hess. Lafon found in one case aniridia in one eye, while the other contained an iris whose vessels freely anastomosed with those of the posterior tunic.

The coloboma of the iris is due to the fibrous cord which is probably derived from the embryonic mesoderm.

The presence of the bodies resembling the rosettes of Wintersteiner seen in glioma, tends to shew that these are caused merely by the folding of the retina.

The cartilaginous nodules are degenerations of the mesoderm.

Microphthalmos has been divided by Van Duyse into

a Microphthalmia or nanophthalmia, in which the eye is normal but small.

β Microphthalmos with coloboma of iris.

γ Microphthalmos accompanied by extensive malformation and reduction in size.

The most frequent malformations met with are—Coloboma of iris, various colobomata of the globe, interstitial keratitis, dermoid tumours, and internal strabismus.

The cause of the condition is either arrest of development or intra-uterine inflammation: both causes apparently operate. Cases of the former are frequently associated with deformities of other parts—those of the latter shew fibrous bands arresting development.

Case I. is probably of the inflammatory type, as borne out by the opacity of the lens.

Case II. was due to arrested development, caused by an amniotic bridle attached to the anterior surface of the globe. This was probably of traumatic origin, for the mother while

pregnant received a violent blow on the abdomen from a cow's horn.

Case III. was inflammatory in origin as shewn by the fibrous intraocular bands, which point to intra-uterine inflammation of the mesoderm.

WILFRID ALLPORT.

LOEWENSTEIN (Prag). **Regional Anæsthesia in the Orbit.**

Klinische Monatsblätter für Augenheilkunde, June, 1908.

CONSIDERING that the methods hitherto employed to produce local anæsthesia for such operations as enucleation have proved unreliable in certain cases, notably where the eyes are inflamed or painful, Loewenstein, at the suggestion of Prof. Elschnig, has devised a method which he believes to be reliable, easy of performance and free from danger.

The method is based on the fact that the sensory supply of the whole eyeball is through the long and short ciliary nerves; and that these paths unite at a point very near the ciliary ganglion. An injection of the local anæsthetic at this point would therefore interrupt the conductivity of all the sensory nerves of the eyeball and render the latter anæsthetic. The older methods consisted in infiltrating with the anæsthetic solution the tissues to be cut.

Loewenstein determined by dissection the position of the ciliary ganglion with reference to the centre of the outer orbital margin. Its distance from this point he found to be 4.5 cm., with slight variations.

The procedure is as follows:—Having cocainised the conjunctiva, the outer canthus is stretched towards the temporal side, and the point of the needle entered a little below the centre of the outer orbital margin, namely at the level of the lower border of the external rectus muscle. He uses a Pravaz syringe filled with 1 per cent. cocaine containing a little adrenalin, and the needle used is 5 cm. long and correspondingly strong. The needle is passed for some distance along the outer orbital wall and then upwards and inwards till 0.5 cm. of the needle remains uncovered. After having made sure by slight levering movements that the needle has not entered the optic nerve, the fluid is injected.

Almost immediately, or in two minutes at the most, the eyeball and its contents are quite insensitive. In some cases of long standing the injection failed to anæsthetise the conjunctiva,

so it became the author's practice in such cases to inject some of the cocaine subconjunctivally. Most of the patients had a hypodermic injection of about $\frac{1}{6}$ grain of morphia half an hour before the operation, more for its quietening effect on the patient than as an actual anæsthetic.

The paper includes the results of the use of this procedure in 26 cases of enucleation, exenteration and cyclodialysis, the ages of the patients ranging from 10 to 88 years, and in almost every case the anæsthesia was satisfactory.

The method seems likely to prove valuable where a substitute for general anæsthesia is desired in enucleation and similar operations, and the few accidents, more disconcerting than dangerous, which Loewenstein has met with should prove to be avoidable with a more extended experience of the technique.

A. J. BALLANTYNE.

WIRTZ. Cultivation of the Tetanus Bacillus from the Pus of a Traumatic Panophthalmitis. Remarks on Prophylaxis in Cases of Eye Injuries infected with Tetanus.

Klinische Monatsblätter für Augenheilkunde, June, 1908.

THE patient was a child of eighteen months admitted with a ragged perforating wound of the cornea. There was prolapse of the iris and vitreous, and the anterior chamber was full of blood. No history of the injury was forthcoming. The wound was trimmed and cleaned, and covered with a conjunctival flap. Forty-eight hours after the injury the child was fevered, there was great œdema of the lids and chemosis, and the eye was full of pus.

At this stage further enquiries revealed the fact that the father had injured the child's eye with the lash of a whip used for driving swine.

The pus from the eye contained many different organisms, some of them morphologically resembling the bacillus tetani. Twenty units of tetanus antitoxin were administered, the eye eviscerated and the sclera cleaned out with oxycyanide. The tetanus bacillus was isolated in cultures and its identity confirmed by the results of animal experiments. The other organisms were *Bacillus subtilis*, *B. mycoides*, *B. proteus vulgaris*, *B. coli commune*, *Staphylococcus pyogenes aureus*, and two others not identified. Either of these in sufficient numbers might by itself have caused panophthalmitis.

After removal of the eye, healing was uneventful. It is

impossible to say whether, if left to itself, tetanus would have developed; or whether the exenteration or the antitoxin was answerable for the favourable result, but the author considers that both measures were demanded. Though the use of antitoxic serum has greatly reduced the mortality from tetanus, it is not a certain preventive. Local treatment, such as surgeons employ in other parts of the body, is not applicable to the eye without injuring its function, and in perforating wounds nothing short of evisceration or enucleation can insure the removal of the source of infection.

Wirtz discusses the arguments for and against removal of the eye in cases of injury in which the tetanus bacillus has been found or its presence suspected. Perhaps his experience with this case has rather biassed him in favour of radical measures, but as he himself suggests, each surgeon must be influenced in his treatment by the known frequency of tetanus infection in the district in which he works.

The author states that sixteen cases have been published in which tetanus developed after a wound of the eyeball only. He believes his to be the first case in which the bacillus has been recovered from the wound before the occurrence of symptoms of tetanus.

A. J. BALLANTYNE.

LENZ (Breslau). **New Results in the Study of Sympathetic Ophthalmia.** *Berliner Klinische Wochenschrift*, April 27, 1908. Translated in the *American Journal of Ophthalmology*, June, 1908.

LENZ's article deals fairly fully with the theoretical problems which have from time to time been put forward in the attempt to explain the cause of sympathetic ophthalmia. He mentions Fuchs's interesting experiment in which he examined 200 eyeballs (enucleated on account of lesions capable of causing sympathetic inflammation) and whilst ignorant of their history picked out 29 which shewed an anatomical condition which he considered characteristic of sympathetic ophthalmia. Then looking up the histories of these cases he found that in these 29 cases a sympathetic inflammation had actually existed in the fellow eye, and in these 29 cases alone. The character of such "sympathising" inflammation is an infiltration of the uveal tract, which produces an enormous thickening, especially

of the choroid. An identically similar condition is found in the sympathetically inflamed fellow eye.

As to the mode in which the inflammation passes from one eye to the other, Lenz shows that the Leber-Deutchmann transmigration theory, which held the field some 20 years ago, has had to be abandoned as against the weight of anatomical evidence. The Schmidt-Rimpler "modified ciliary nerve theory" assumed that a transmitted irritation produced certain disturbances in the nutrition of the secondarily affected eye which rendered it an easy prey of accidental micro-organisms, which need not necessarily be produced by the injured eye, but might come from any infective focus in the body. This theory also is rejected by Lenz, as inconsistent with the absolute identity of the pathological process in the two eyes.

Lenz is strongly inclined to support the proposition started by Berlin and amplified by Roemer, of an organism which has its specific habitat in the eye itself (as the tetanus organism may be said to have its specific habitat in the nervous system) and which is carried from the one eye to the other by means of the general blood stream. Fuchs had already noticed that in "sympathising" eyes groups of cells could be seen breaking through into the venous channels, and Lenz has been able to confirm this in a typical manner in a specimen of his own. He has observed also, in an early sympathised eye, numerous obstructions of retinal arteries, which, occurring in an otherwise intact retina, he was obliged to look upon as of embolic origin. That such emboli have not yet been demonstrated in the choroidea, and (still more important) that the specific organism has not yet been detected, are certainly gaps in the chain of proof: but in spite of these Lenz believes that the theory of specific metastases has to-day stronger evidence to support it than any other hypothesis. A. A. BRADBURN.

CHAVERNAC (Marseilles). **Double Optic Neuritis following Varicella.** *Annales d'Oculistique*, July, 1908.

THE extreme rarity of this complication of chicken-pox (the first case of which was reported in 1886 by Mr. Jonathan Hutchinson junr., in this Journal), has induced the author to put on record a second case which came under his observation.

The patient was a boy, 11 years of age, who had an attack of chicken-pox from which he made an uninterrupted recovery. His sight, however, began to fail, and in four months he was

unable to count fingers at a distance of one metre. The boy was taken to several surgeons who all diagnosed optic neuritis; various forms of treatment were employed, including mercurial frictions and injections, strychnine, and the continuous current, but without any improvement in his vision.

The disease had persisted for nine months when Chavernac saw the patient for the first time. An enquiry into his family and personal history failed to elicit anything of importance. The boy showed signs of general anæmia. On ophthalmoscopic examination the optic disc in each eye presented the usual signs of swelling, indistinctness of its margins, etc., and several fine hæmorrhages over its surface; there was a central scotoma for red and green, while the fields were contracted peripherally by 20° all round.

For treatment Chavernac made use of subconjunctival injections of hetol (cinnamate of soda, 11 per cent. solution) 5 or 6 drops at a time, at intervals of two or three days, with the result that after 15 such injections the boy's vision rose from $\frac{2}{50}$ in each eye to 0.1 and 0.6 in the right and left eyes respectively; the central scotoma disappeared, and the fields became fuller. After an interval of several months this treatment was resumed and the vision was still further improved (to 0.4 and 0.9). When the boy was seen two years later this improvement was found to be maintained.

In conclusion, Chavernac deprecates the treatment of such cases of toxic origin with mercury, but recommends hetol, and emphasises the fact that a good result may be obtainable even where the optic neuritis has lasted for many months.

THOS. SNOWBALL.

C. A. WOOD and T. A. WOODRUFF (Chicago). **Commoner Diseases of the Eye.** Third edition. 1907. Chicago: W. T. Keener & Co.

WHEN this little book first appeared in 1904 we expressed a favourable opinion on it; this opinion we have no need to modify now that it is in its third edition. The only criticism of a nature not altogether favourable which we would offer is that perhaps for student's use—it is indited "For students of medicine"—it may be a little too long, but it would not be easy to put one's finger on any paragraph which should have been omitted. The book should command a ready sale, as, indeed, it has already done.

THE CAUSES AND SYMPTOMS OF THROMBOSIS OF THE CAVERNOUS SINUS.*

By STCLAIR THOMSON, M.D., F.R.C.P. (Lond.),

*Physician for Diseases of the Throat in King's College
Hospital.*

THE causes of thrombosis of the cavernous sinus are chiefly found in diseases of the nose and ear, and therefore come within the dominion of the oto-rhinologist. The symptoms are more prominent and distinctive in the eye, and hence fall largely under the observation of the ophthalmic surgeon.

The present seems, therefore, a favourable occasion for conferring on the subject, when members who practice these two specialities can meet to supplement each other's experience.

As regards the causes of this very serious infection a fairly extensive perusal of the literature of the subject, including many leading text-books of ophthalmology, has given me the impression that the proximate and most probable source of sepsis has often been overlooked. The source of infection is frequently attributed to some lesion on the nose or upper lip, to a carious tooth, or a phlegmon of the face and neck, when the much more probable focus in the accessory cavities of the nose has not even been suggested. Thus E. W. Dwight and H. H. German have published a very complete bibliography of 178 cases reported in literature; yet the value of their observations is greatly diminished by the absence in nearly all cases of a clinical or post-mortem examination of the nasal accessory

* A paper read at the Annual Meeting of the British Medical Association in Sheffield. July 1908.

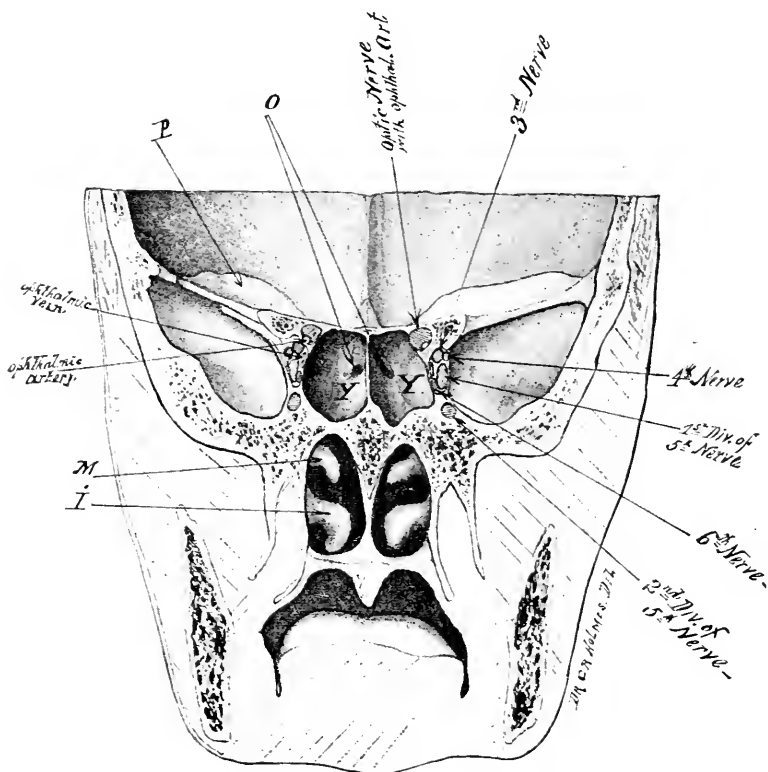


Fig. 1. Frozen section of anterior half of head cut immediately in front of chiasma. Viewed from behind. P, orbital roof of frontal sinus; O, ostium sphenoidale; YY, right and left sphenoidal cavities; I, M, inferior and middle turbinates.

sinuses.¹ The condition of the ears is more frequently referred to, but the possibility of nasal infection is more rarely and briefly mentioned. Yet by recalling the anatomical relations of these venous spaces we should be prepared for the possibility of finding how much more frequent is infection by the nasal route.

1. *Boston Medical Journal*, May 1st, 1902.

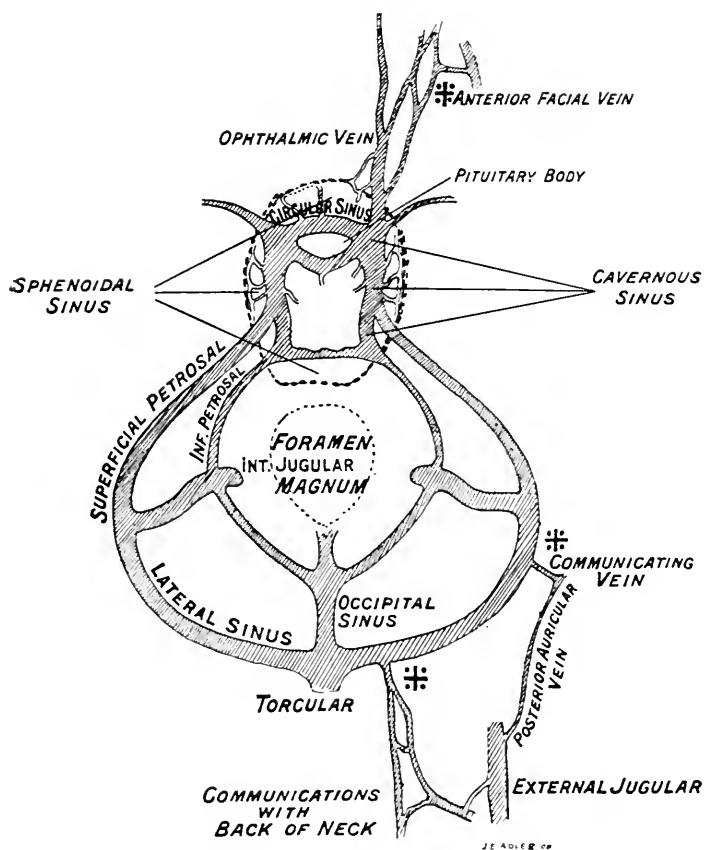


Fig. 2. Diagram to show communication of veins of cavernous sinus with venous sinuses of the cranium; showing also inter-relation of transverse and cavernous sinus with external veins. The asterisks (*) mark the anastomoses of the intra-cranial venous system with the veins of the surface. (Modified from Leube.)

The diagram (Fig. 2) will serve to recall the anatomical relations of the blood spaces. It will be seen that anteriorly the cavernous sinus receives the ophthalmic vein. Through this vein infection might be carried:—

1. From the upper eyelid and forehead.
2. The lachrymal gland.

3. The globe of the eye and its muscles.
4. The orbit.
5. The nose (by the anterior and posterior ethmoidal veins).
6. The lower eyelid and the face (through the anterior facial veins).

These sources of infection are so evident, and have long been so well recognized, that it is unnecessary to insist on them.

Passing further back we see that twigs of the pterygoid plexus join the sinus through the base of the skull. This route has sometimes been invoked for the transit of infections from the pharynx. It is a remote, restricted, and doubtful possibility.

Posteriorly the cavernous sinus communicates with the superficial and inferior petrosal sinuses, and through them with the lateral. This explains the not infrequent thrombosis from pyogenic infections of the ear.

Figure 3 shows a case of thrombosis of the cavernous sinus which my colleague Mr. A. Cheatle kindly permitted me to see in his service. The infection was from the ear. The case is also interesting from the fact that the otitic lesion was on the left side, yet the earliest ophthalmic changes were on the right. Both by a clinical and a post mortem examination I was able to exclude the possibility of any infection from the nose or its accessory sinuses.

But still closer and in more intimate contact lies the sphenoidal sinus, separated only from the cavernous sinus by a wall of bone which may be as thin as note paper, or even with physiological defects in it, so that the mucosa of the sinus is in direct contact with the dura mater. (Zuckerkandl.)

The diagram shows the numerous veins which pass directly from the sphenoidal to the cavernous sinus, and, in addition to the possibility of infection by direct transit through the bone or by the blood stream, we know that



Fig. 3. Thrombosis of the cavernous sinus; symptoms most marked in the right eye, although the infection came from the left ear.

organisms can travel from one cavity to the other by the lymph stream.¹

Finally, by means of the circular sinus, we see not only how readily infection may pass from the cavernous sinus of one side to that of the other, but how direct is the contamination with any pyrogenic process in the pituitary body or adjoining body of the sphenoid bone.

1. Zörkendörfer. *Prager med. Woch.*, vol. xviii, March 3rd, 1893, No. 18, p. 209.

This anatomical review will preface the way for my thesis that the most common cause of thrombosis of the cavernous sinus is disease of the sphenoidal sinus. I have given full proof of this source in one case published in the "Transactions of the Medical Society of London" (vol. xxix, 1906), where I have collected particulars of sixteen others occurring in literature, with post-mortem confirmation in all instances.

Next to disease in the sphenoidal sinus it would appear that pyogenic infection from the ear is the most common cause. Naturally, I have little experience of the cases where infection is carried by the ophthalmic vein and its anastomoses, and I hope my colleagues of this section will correct me if I am wrong in placing it third in frequency. I should be glad to hear if they have observed cases which were undoubtedly traceable to diseases of the face and eyelids, and if it may occur as a complication after operation on the eye or orbit.

Infection through the pterygoid plexus I would put last, although the possibility of this route is suggested by a case in which I heard that it occurred after operation on the Gasserian ganglion. I think this route is sometimes suggested without sufficient evidence. Thus a peritonsillar abscess is given as the cause of a case of thrombosis by Jacques and Lucien.¹ A very complete post mortem showed that the sphenoidal, ethmoidal and aural cavities were healthy. The jugular, lateral and petrous sinuses were intact. The authors suggest that the route of infection was by the peripharyngeal plexus of veins, although they were not altered macroscopically. But the peritonsillitis to which they attributed this, had been on the right side, and the thrombosis started on the left side. Besides, the autopsy revealed osteomyelitis of the sella turcica and the point of the petrous bone—quite sufficient to explain the

1. *Société Française d'Oto-laryngologie*, Mai, 1908.

infection of the cavernous sinus, without seeking a more distant and doubtful cause. Even in recent researches the post mortem examination of the sphenoidal and other sinuses is frequently neglected. In a case of Carl Tollens, the thrombosis is attributed to phlegmonous pharyngitis, and it is presumed that infection travelled along the delicate veins which pass from the pharyngeal venous plexus through the base of the skull.² It would be much more likely, even if the primary infection were in the pharynx, that it invaded the sphenoid and pursued the easier route thence.

SYMPTOMS OF THROMBOSIS OF THE CAVERNOUS SINUS.

The second division of my subject embraces the symptoms, and as the principal and characteristic ones are the conditions of the eye, I trust to my ophthalmic colleagues to correct and supplement any observations I have to make.

Needless to say the spread of infection to the sinus will depend on the focus from which it starts—in the nose and its accessory sinuses, the ear, the orbit, or the throat and neck. I will simply enumerate some: They may be those of co-existing meningitis, pyogenic temperature, rapid pulse, profuse perspiration, rigors, headache, sickness, hebetude, delirium, drowsiness, coma, convulsions, inflammation of the glands of the neck, swelling of the palate, or of the cheek.

But, generally, the possibility of thrombosis of the cavernous sinus is first suggested by the condition of the eyes. The three chief ophthalmic changes are: (a) papillary œdema, (b) chemosis, and (c) exophthalmos. They develop from six to sixteen days from the onset of symptoms indicating the spread of infection. It is possible that neither proptosis nor chemosis may occur in a rapidly

2. Carl Tollens. *Archives of Otolology*, xxxiii, 1904, p. 487.

fatal case. The œdema and proptosis may diminish during the progress of the case. This proptosis and chemosis may be present on both sides when it is first noticed, but it generally starts on one side, and develops in the other one to six days later.

There may be anæsthesia, or ulceration of the conjunctiva, or opacity of the cornea.

Paralysis of the ocular muscles generally occurs; but the movements may continue. In one case the ocular symptoms developed under observation, and followed each



Fig. 5. Thrombosis of the cavernous sinus; shows the œdema of the eyelids, proptosis, chemosis, ophthalmoplegia, and commencing ulceration of the conjunctiva.



Fig. 4. Probe in left sphenoidal sinus: rubber plug in left maxillary sinus. Both frontal sinuses have been operated and both ethmoidal cells.
(Radiograph by Mr. A. D. Reid.)

other in regular order, the proptosis not making its appearance till several hours after the orbital paralysis had become complete.¹

The condition of the pupils varies. They may be normal, unequal, small and not reacting to light, dilated, dilated and not reacting, or in medium dilatation with only slight oscillation. Doubtless the explanation of these observations lies in the fact, noted in my own case, that the condition of the pupils varies, for I sometimes found them equal and reacting, and at other times medium sized or widely dilated.

The fundus may be normal in rapid cases or at the commencement. Later on there may be congestion of the retinal veins, papillary stasis, papillary oedema, papillary atrophy, or optic neuritis. The absence of papillitis, or of swelling has been observed.

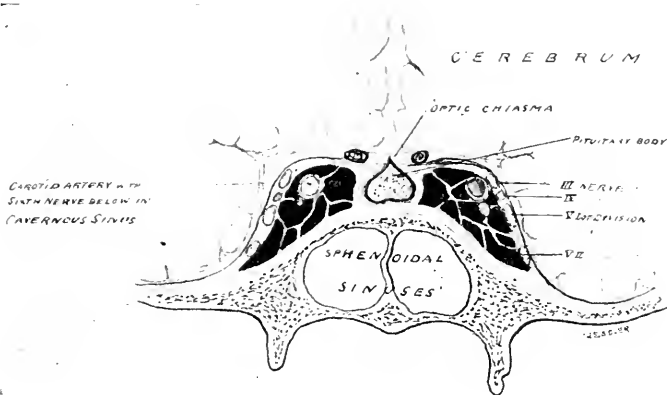


Fig. 6. (Semi-diagrammatic). Coronal section, through sphenoidal sinus, to illustrate immediate relationships with cavernous sinus and its contents, optic nerve and base of brain.

1. James Russell. *Medical Times and Gazette*, 1878, vol. i, June 8th, p. 614.

It is difficult in most cases to test the vision; it may be good or there may be complete blindness.

Tenderness of the eyeball may be met with.

The external appearances are well illustrated in Fig. 5 the photograph of a case which occurred in my own practice. A reference to the diagram of Fig. 6 will help us to understand how the nerves may be affected differently in various cases. Doubtless this variability in the symptoms depends on the degree and extension of the thrombosis, whether it extends forwards from the sinus, or originates in the ophthalmic vein and then spreads backwards.

The correction of errors or omissions in this part of my paper will be welcomed, and by thus uniting our studies, I hope we may be able to extend our knowledge and helpfulness, which is apt sometimes to be hindered by a too exclusive devotion to the limits of our own special province.

REVIEWS.

GEO. S. DERBY (Boston). **The Increasing Importance of Tuberculosis as a Cause of Ocular Disease. The Newer Methods of Diagnosis and Treatment.** *Archives of Ophthalmology*, Vol. 37, No. 5, September, 1908.

RECENT investigations tend to show that tuberculosis of the eye is less uncommon than is generally believed. Helbron reports that, of 15,000 cases observed in the Berlin clinics, 1 in every 200 was tubercular. The marked discrepancy between the earlier and later estimates is probably fully explained by the greater ease and certainty of diagnosis at the present time.

Derby's observations on the tuberculin tests were made by means of the Calmette or ophthalmo-reaction, and by the cutaneous reaction of von Pirquet. In the former test he used a 1 per cent. solution exclusively; in the latter he employed, at first, Alexander's old tuberculin in full strength, and later a 25 per cent. solution as recommended by Wolff-Eisner. About 150 cases have been tested: 103 of these are now reported. Of these, 83 reacted positively, 18 were negative, 2 were doubtful.

The conjunctival test was performed 61 times: 45 positive, 14 negative, and 2 doubtful. The cutaneous test was performed 58 times: 52 positive, 4 negative, 2 doubtful. On 16 patients both tests were performed: on 14 both were positive; once the skin test was positive and the conjunctival negative, and once both were doubtful.

In 93 cases, thought to be tubercular by reason of clinical history, etc., the results were as follows:—43 cases of "phlyctenular" disease gave a positive reaction in 38; 16 cases of relapsing sclero-keratitis, all positive; 16 cases of scleritis, 13 positive, 2 negative, 1 doubtful; 9 cases of uveitis (chiefly anterior uveitis) all positive.

Of 3 cases of interstitial keratitis, 2 were positive and the third a healed case, which 18 months previously had reacted to tuberculin subcutaneously and had suspicious signs in the lungs. The remaining cases do not require mention.

In 4 cases reaction was delayed and did not take place until after 48 hours. Two of these delayed reactions were conjunctival; one was cutaneous, and one showed delayed reaction to both tests.

In several of the phlyctenular cases an obstinate conjunctivitis of several weeks duration followed the application of tuberculin to the eye.

In Derby's experience the cutaneous test has apparently been more sensitive than the conjunctival. No untoward results have followed its use. The reaction has varied from a very slight redness and swelling around the vaccinated area to a very marked redness and puffiness of some extent, and several times a bleb has formed.

Wolff-Eisner calls attention to the special value of this test to the ophthalmologist, but other writers have objected to it as uncertain except in infancy, and some regard it as too delicate.

The exact relationship between the conjunctival and cutaneous tests has not yet been worked out and will remain undecided until many cases have been tested simultaneously by both methods and the results compared. If it be true, as seems probable, that the cutaneous test is quite reliable, it will supplant the conjunctival test in ophthalmic practice, for already in a number of cases severe disease of the eye has been induced by the former test. The cutaneous test takes but little more time in application, is at least equally sensitive and is

harmless. The method of applying it is as follows:—the skin, usually of the arm or forearm, is cleansed with ether, and a drop of a 25 per cent. solution of old tuberculin in 5 per cent. carbolic acid is placed on the skin and scratched in with a sterilised lancet, very lightly, so as not to cause bleeding. A similar vaccination with 5 per cent. carbolic solution alone is made on the skin near by as a control. Protective dressings are applied. The positive reaction consists in the appearance of a papule. This occurs within 24 hours, rarely later, and lasts 5 or 6 days.

In 46 of his cases, Derby had a thorough physical examination made for evidences of tubercle, and 32 of these showed some general evidence of tuberculosis. Of these 32 cases, 17 had phlyctenular keratitis, 9 sclero-keratitis, 3 scleritis or episcleritis, 2 interstitial keratitis, 1 a superficial corneal ulcer. The phlyctenular series is interesting and striking, and Derby's figures point strongly to a tubercular origin of phlyctenular lesions. Out of 43 such cases, 38 reacted to tuberculin. In 19 cases a physical examination was made, and of these 16 gave some physical signs of tubercle; this is probably a higher percentage than will be found among a larger number of cases.

If tubercular disease of the eye is as prevalent as these figures tend to show, it will lie in the power of the ophthalmologist to take a more active part in the fight against tuberculosis than he has hitherto been able to do. Phlyctenular cases are extremely common, and examination of them may lead to the discovery of incipient tuberculosis in the most favourable stage for expert treatment.

In reference to treatment, Derby has been fortunate in being able to place many of his patients in the "tuberculosis class" of the Massachusetts General Hospital. There the patient is carefully examined, weighed, and the temperature taken. He is given explicit directions as to mode of living, fresh air, amount of food, exercise, etc. He is given a book in which to make a careful record of his daily routine. He is visited in his home, and is shown how to live in the open air. Such methods of treatment have proved very satisfactory; unfortunately they are not within the reach of many patients.

Derby's observations on the use of tuberculin in some 30 cases have not convinced him of its therapeutic value; but he is still making use of it. He gives $\frac{1}{1000000}$ of a milligram of new tuberculin as an initial dose; the amount being gradually

and carefully increased. Injections are given once a week. He thinks that cases of tubercular disease of the eyes seem especially susceptible to tuberculin, are very quick to react locally, and to show a rise of temperature. As a rule, the production of a local reaction in the eye has seemed to do harm.

J. B. L.

ROHMER (Nancy). **Ocular Tuberculosis and Tuberculin, T.R.**
Archives d'Ophthalmologie, July, 1908.

IN this article Rohmer deals only with tuberculosis of the anterior segment of the globe, almost exclusively the cornea, iris, and ciliary body. The etiology of tubercular lesions of the superficial tissues of the eyeball may differ materially from that of the deeper structures, the conjunctiva and sclera being frequently subject to direct inoculation, while the cornea and the uveal tract are attacked by endogenous infection. The clinical course also differs; lesions of the first group are easily and effectively dealt with by surgical interference: those of the latter group cannot be easily cauterised or excised. In this respect they resemble lesions of the posterior segment of the eyeball, but they are more common than tubercle of the choroid or retina.

Two distinct types of tuberculosis of the cornea are described: one analogous to parenchymatous keratitis of syphilitic origin, in which gradual invasion of one, or of both, corneæ occurs. It is interesting to note the rapidly favourable effect of injections of tuberculin on cases of this kind: dense general opacity of the cornea quickly becomes less and ultimately disappears entirely or almost so.

The other type is characterised by the presence of tubercular nodules either in the substance of the cornea or on its posterior surface close to the iris angle. Such cases may be classed as keratitis or irido-cyclitis according to the site of active disease.

A variety of iritis is met with, analogous to the first type of keratitis described above. It is slow and persistent, liable to frequent recurrences, and its chief characteristic is its amenability of treatment by tuberculin. According to Venne-

mann, tubercular nodules are found on the posterior surface of the iris in this variety.

More common than this type of tuberculosis of iris is one in which grey or yellowish nodules are found in the anterior chamber, on the posterior surface of the cornea or on the front surface of the iris, or in the angle of the chamber invading both structures.

Rohmer refers briefly to the early history of the therapeutic use of tuberculin, giving references to a number of important papers on the subject. His method of administration is as follows:—The temperature of the patient having been carefully observed for several days, the injections are begun by a dose of $\frac{1}{500}$ milligramme. The injection is repeated every second day, taking care that the temperature is noted thrice daily, or more often. Daily injections are inadvisable; a rise of temperature not infrequently occurs the day after the injection, and it is necessary to wait until the temperature is normal before administering another dose. The dose is increased by $\frac{1}{500}$ milligramme on each occasion until the tenth application, when the dose will be $\frac{1}{50}$ milligramme, and after this the amount is augmented by $\frac{1}{50}$ milligramme at each injection, provided the temperature remains normal. If the temperature rises above 38°C ., no increase in the dose is permissible, until the febrile reaction subsides.

Rohmer does not mention the maximum dose he employs, but quotes v. Hippel's statement that it is futile to exceed one milligramme. He insists on the necessity of continuing the treatment sufficiently long in spite of the desire of the patient that the injections should be discontinued. In severe cases a six months course of treatment has been necessary. Rohmer gives details of eight cases, all in children or adolescents, of keratitis or iridocyclitis. The results of treatment by tuberculin were very striking, even though there was, in some of the cases, room for doubt as to the etiology of the eye affection.

Rohmer refers, at some length, to the writings of others on this subject. His conclusions are, in brief, as follows:—Two clinical forms of ocular tuberculosis are to be distinguished: (1) tuberculosis of the posterior segment of the eye, rare, usually indicative of grave general disease, and not very amenable to treatment; (2) tuberculosis of the anterior segment of the globe, a more localised malady and more easily influenced by tuberculin. It is essential to recognise the nature of the

disease at an early stage; there is, however, no necessity for a prolonged course of treatment by mercury and iodides for diagnostic purposes; the cutaneous and conjunctival tests, and the injection of tuberculin, may be applied without delay and without danger.

Tuberculin T.R., is the product to which preference should be given; employed in moderate and progressive doses, it seems to be free from risk as a means of diagnosis, as well as treatment. The result of this treatment is the rapid clearing of parenchymatous keratitis of tubercular origin and the disappearance of nodules and exudation in the iris.

The general condition of the patients in the majority of cases has been very favourably influenced by the tuberculin treatment, and pulmonary and other lesions, if not too advanced, have undergone amelioration or cure.

J. B. L.

The Treatment of Chronic Simple Glaucoma by the production of Filtering Cicatrices in the Sclera.

RECENTLY there have been two important discussions on these comparatively new modes of treating glaucoma of the chronic type: the one at the Société d'Ophthalmologie de Paris, on July 7th, where the discussion turned on the operation of Lagrange, the other at the meeting of the British Medical Association at Sheffield in the last week of July, when Herbert's operation was considered.

In Paris MM. Rochon-Duvigneaud and Barbadault described some experiments performed on the dead human eye to determine the anatomical conditions of the scleral fistula produced by sclerectomy. It was felt that Lagrange was not specific in his description of his operation, nor did he state whether he wished to produce a real fistula or only a thinning of the sclera. What was believed to be his operation was done on twelve eyes; sections of the eyes were then made and examined. Of the several conditions found:—one, with an anterior and square-edged wound, was such that it could not be doubted a tough unyielding scar would result. A second showed the wound too far back and too much bevelled so that the ciliary body was exposed, a result that was dangerous. A third was found to leave a minute but clean opening through the sclera

into the angle of the anterior chamber; this they considered the successful procedure. To obtain it puncture and counter-puncture should be in the limbus, at most a millimetre from the cornea; the sclera should be cut obliquely so as to provide a tongue-shaped flap $2\frac{1}{2}$ mm. long, this tongue should be cut off at its base close to the cornea and to the attachment of the conjunctival flap.

M. Morax showed sections of an eye upon which he had performed Lagrange's irido-sclerectomy. The patient had been suffering from acute secondary glaucoma and acute pain; enucleation was refused. The operation did not relieve the conditions, and in the end the eye was removed. Sections showed an open fistula and conjunctival œdema, but the root of the iris was impacted within the wound. He should report the case in detail later on.

M. Félix Lagrange read a paper on "Simple Sclerectomy in Chronic Simple Glaucoma." He said there was a question as to which part of a irido-sclerectomy—the section of the iris or the section of the sclera—we must ascribe the success of this operation. He described a series of five cases in each of which a simple sclerectomy was successful. His procedure was:—To incise the sclera as far from the cornea as possible so long as the cut opened the anterior chamber and was in front of the iris. A 4 mm. incision was sufficient. He aimed to cut through the scleral attachment of the ciliary muscle, and to open the choroidal spaces which communicate with the anterior chamber. A large conjunctival flap was made, and turned back, and the forward lip of the scleral wound cut off with scissors to its base. The conjunctival flap was replaced to cover the scleral breach. The operation could only be performed when the filtration angle was open; if the iris blocked it the knife would cut through the root of the iris making a basal dialysis.

He insisted that the operation was designed to produce a real scleral fistula: the scar might look clean and smooth, but direct passages from the anterior chamber to the subconjunctival tissue existed, even though they might be of minute size. He repudiated any likeness between his operation and that of Bettremieux, who only snipped off the scleral layers external to the canal of Schlemm, and aimed at the production of a thin scar, which though thin was probably a true scar and therefore impermeable.

In conclusion, for the sake of clearness and at the risk of being dogmatic, he would classify these cases and the treatment appropriate for them in the following manner:

For cases of normal tension, or under $+1$, he advised simple sclerectomy preceded by the plentiful use of adrenaline, eserine and cocaine; the eserine was to be continued until such time as the anterior chamber was reformed.

In cases of tension, from $+1$ to $+3$, sclerecto-iridectomy was indicated. And he did the iridectomy less with a view of obtaining benefit from excising iris, than with a view to prevent the prolapse and entanglement of the iris within the scleral fistula.

M. Abadie made a long and vigorous speech in which he rejected most of the premises on which the rationale of filtering scars rested. He maintained from the arguments of clinical experience and simple common sense that the filtration theory was most hypothetical. The experiments of Otto Wiss (*Arch. de Pflüger*, 1906, p. 602) showed that aqueous currents did not exist. Further, if in chronic glaucoma the block was at the spaces of Fontana then the anterior chamber should be deep, but it was not. Again cures were obtained after iridectomies with clean, smooth, invisible scars; and failures were seen with cystoid scars of the filtration type. He did not say that Lagrange's operation was useless, it might well be adopted where iridectomy had been unsuccessful. He protested against the tendency manifest now-a-days to shirk the responsibility for doing a proper iridectomy by falling back upon the easier, but ineffectual, use of myotics. All the world knew the value of iridectomy in acute or subacute inflammatory glaucoma, no one dared suggest a sclerectomy for these cases, so they were out of the discussion. He divided the chronic simple glaucomas into two groups: 1. Distinct rise of tension without inflammatory symptoms—these, he said, should always have iridectomies. 2. Those in which the diagnosis rested solely on the appearance of the fundus of the eye and the visual field—in these we could rely, and that with perfect safety, on the use of eserine, 1%, thrice daily. He quoted the case of Javal in support of his contention.

M. Rochon-Duvigneaud maintained that the normal anatomy and physiology of the region did not matter when a scleral fistula was produced. A new and simple, though artificial,

and perhaps gross passage for the flow of the aqueous replaced that of Schlemm's canal.

M. Morax described a case where iridectomy had successfully reduced glaucoma for the space of a year, then a severe relapse in both eyes occurred; it was quieted and some amelioration of vision obtained by sclerectomies. He however questioned the possibility of the production of so nice and exact a line of incision as that shown by Lagrange's diagram, which cut through the tendon of the ciliary muscle; it was necessary to secure histological proofs before we could claim such results.

At the annual meeting of the British Medical Association, Mr. H. Herbert, of Nottingham, showed a series of cases, giving eight eyes, that had been operated upon by his method of producing filtration cicatrices of the sclera. In his operation after the anterior chamber has been opened by a very narrow bladed Graefe knife passed across horizontally, a short scleral flap is made, but left attached at its apex; then by changing the direction of the knife edge and making two cuts forward and upward a narrow strip of sclera is detached from the flap at the limbus. The whole procedure is subconjunctival, so that the wedge of sclerotic detached is left adhering to the conjunctiva, which holds it loosely in the groove cut in the sclera. A small buttonhole iridectomy is usually made, in order to prevent prolapse of iris. Herbert maintains that his operation should produce a permeable scar, and not a definite scleral fistula, such as Lagrange frankly admits he aims at making; Herbert considers that an actual fistula may leave the eye dangerously soft.

In the discussion which followed the demonstration, Dr. Thomson Henderson, of Nottingham, said no doubt filtration could take place through a scar that was fresh and soft; but his experience of corneal scars went to prove that when they were healed the new tissue was impermeable owing to ingrowth of epithelium, and no filtration took place unless a fistula had been made. Lt.-Col. F. P. Maynard, of Calcutta, said there was no denying the brilliance of the results of the operation as seen in the cases exhibited. At first he had thought the operation complex, but a demonstration had proved that it was really very simple and very pretty. He remarked that the peripheral iridectomy must be omitted before we could assess the true value of the principle of the operation.

Mr. A. L. Whitehead, of Leeds, said he had not yet tried Herbert's operation, but the use of Lagrange's operation in his hands had not secured any better results than those he had been accustomed to obtain by the wide iridectomy. He thought a much longer series of cases, and the lapse of more time after operation were necessary before a proper estimate of the relative values of these operations could be made.

Mr. Herbert, in replying, said that he only did an iridectomy when the root of the iris prolapsed and by blocking the wound threatened to vitiate the operation.

N. BISHOP HARMAN.

FUCHS (Vienna). **Outgrowths and Tumours of the Ciliary Epithelium.** *v. Graefe's Archiv für Ophthalmologie*, lxxiii, 3, p. 534.

IN this paper Fuchs discusses in detail a series of cases of tumour of the ciliary epithelium which have come under his notice, and takes the opportunity to pass in review also the cases hitherto published by others, of many of which he has been able to obtain sections for his personal investigation. On this basis he attempts a systematic classification of the tumours, innocent and malignant, which are derived from the epithelial layers of the ciliary body.

First he describes in a class by themselves the simple outgrowths or overgrowths (*Wucherungen*) of the ciliary epithelium, which may be of senile or of inflammatory origin. These may affect either the unpigmented layer, the pigmented layer or both layers. In their simplest form they consist of local thickenings of the epithelial layers, due to enlargement of a few cells with multiplication of their nuclei. By further growth these may come to form club-shaped projections. The larger growths assume the form of cellular strands or cellular membranes. The former are found chiefly projecting from the *pars plana* as if stretched out by the tension of the Zonular fibres. The membranous growths are formed by the coalescence of neighbouring overgrowths of cells. The cellular membrane is separated from the ciliary epithelium by a narrow layer of homogeneous material, and several such layers may be superposed one on the other, always with an intervening layer of non-cellular material. In the inflammatory cases

the cells become altered in form and in arrangement, become pigmented and may undergo retrograde changes such as vacuolation or fibrillation of their protoplasm. When it is the pigmented layer from which the outgrowths spring, the cells may lose their pigment. Thus it sometimes becomes difficult to ascertain the source of the growth. The cells of the pigmented layer may proliferate inwards towards the vitreous or outwards towards the ciliary body. In the former case they may either raise the unpigmented layer or break through it. In some cases the proliferation of cells of the unpigmented layer may give rise to a projecting fold, between the two layers of which a space forms, and thus a cystic swelling develops.

Coming to the tumours properly so-called, Fuchs offers the following provisional classification:—

- I. Innocent tumours (so-called adenomata).
- II. Malignant tumours.
 1. Having the structure of the Embryonic Retina (Diktyoma).
 2. Whose structure does not represent the whole Retina but at most the simple Ciliary epithelium. These consist of either
 - a. Cellular membranes with a single layer of nuclei, combined with cellular tubes.
 - b. Cellular tubes alone, or
 - c. Cells grouped in an irregular fashion, with only a few tubular formations in the youngest parts.

Of the *innocent tumours* twenty have been reported, five of these by Fuchs himself. They occur in elderly persons, and as a rule give no clinical evidence of their presence, having a diameter of less than 1 m.m. (The exception is the case of Coats in which the tumour had a diameter of 4 or 5 m.m. and caused visible elevation of the periphery of the iris.)

The little tumour is situated at the summit of a ciliary process and arises from the unpigmented layer. This grows out into the substance of the ciliary process, and carries before it the pigmented layer. We thus come to have an invagination of both layers of the ciliary epithelium, whose lumen communicates with the interior of the eyeball. Ultimately by the enlargement of the lumen an actual cyst may form.

The tumour is distinguished from a true adenoma by the absence of any stroma and by the direction of the growth. Other names which have been suggested for it are Epithelioma benignum or Euthelioma, but Fuchs prefers to call it simply Innocent tumour of the Ciliary epithelium.

Of the *malignant tumours*, in class 1, the author places four published cases, all of which occurred in young subjects. The tumour is unpigmented, arises from the ciliary body and grows superficially over the ciliary body, iris, posterior surface of the iris and anterior surface of the lens. It causes rise of ocular tension by blocking the filtration angle, and at a later stage infiltrates the tissues, forming compact masses in the ciliary body and proliferating outwards in the sclera. All the eyes have been enucleated before perforation of the sclera occurred.

The characteristic constituents are (*a*) Cellular membranes containing several superimposed layers of nuclei, and thus resembling the embryonic retina before its differentiation into layers; (*b*) Cellular membranes containing a single row of nuclei, corresponding with the unpigmented layer of the pars ciliaris retinae. Sudden transitions from (*a*) to (*b*) may be seen, resembling the transition from the pars optica into the pars ciliaris retinae. Sometimes the cells form structures like the rosettes seen in Glioma of the Retina, the lumen being as a rule lined with a limiting membrane, apparently representing the limitans externa. (*c*) Atypical arrangements of the nuclei, where the tumour forms a compact mass, as, for example, in the substance of the ciliary body. (*d*) Single or double rows of cells, where the tumour is infiltrating the sclera.

As regards the origin of these tumours, the author agrees with Emanuel and Verhoeff that they arise in the pars ciliaris retinae, either as a reversion to the embryonic structure, or by proliferation of persisting embryonic elements.

The names which have been suggested for this class are Carcinoma or Adeno-carcinoma (Lagrange), Teratoneuroma or Neuroma Embryonale (Verhoeff), Malignant Epithelioma of the Ciliary body (Kuthe and Ginsberg), Glioma of the Pars ciliaris (Emanuel). The reasons for and against these names are discussed, but the author prefers to reserve the name Diktyoma for these tumours of the ciliary epithelium which represent the Embryonic retina.

CLASS 2*a* is represented by the single case published by

Treacher Collins (Trans. Oph. Soc., xi, 1891), a pigmented tumour arising from the pigmented layer of the ciliary epithelium and growing into the substance of the ciliary body and iris.

CLASS 2*b* contains a case described by Fuchs in the present paper for the first time. The tumour, a pigmented one, was found in an eye which had been the seat of a plastic endophthalmitis with formation of bone in the exudate. It consisted of an annular tumour of the ciliary body and a number of separate nodules in the posterior segment of the eyeball. The cells grouped themselves in rows or in tubes or in atypical fashions, but everywhere the essential structure was that of epithelial cells without intercellular supporting tissue. Retrograde changes in many parts obscured the "typical" structure. In the ciliary region the tumour was growing from both layers of the ciliary epithelium (the supposed primary focus), other nodules in the posterior segment of the eye were growing from the pigment epithelium of the retina, while other nodules in the interior of the eye could not be traced into connection with either of these and were probably local metastases.

As representative of CLASS 2*c*, the author describes a case published by Schlipp from the Clinic Fuchs in 1899. This tumour also was found in an eye which had passed through a plastic endophthalmitis with formation of bone in the exudate. It originated in the ciliary epithelium, grew into the ciliary body and into the organised exudate, filled the interior of the eyeball, penetrated the choroid and was growing in the supra-choroidal space. As in the last case growth was found to have taken place both from the ciliary epithelium and from the pigment epithelium of the retina. Only in the younger parts were the cells arranged in tubes or thicker lobules, the greater portion of the tumour formed a compact mass. Retrograde changes as in the other tumours led in parts to entirely atypical appearance.

The malignant nature of these three tumours (*a*, *b*, and *c*) was clearly established by their mode of growth. While they are described as separate forms, the author thinks it possible that their essential unity may be established by the discovery of transitional forms.

In an appendix the author reviews two cases of tumour of the retinal epithelium of the iris, and one of tumour of the pigment epithelium of the retina, found in the literature.

These are discussed in relation to the foregoing cases of tumour of the ciliary epithelium.

This paper should be consulted in the original for many minute details, which cannot even be touched upon in an abstract. It is fully illustrated by lithographic plates.

ARTHUR J. BALLANTYNE.

DARIER. **Serotherapy of Ocular Affections.** *La Clinique*

Ophthalmologique, 25th July, 10th and 12th August, 1908.

SEROTHERAPY is still in its infancy and the number of specific serums commercially obtainable is still very limited. This is, in Darier's opinion, the less to be regretted since we have at present but one specific serum which can be relied upon almost infallibly, and that is the anti-diphtheritic. Roemer has prepared a special serum against infection due to the pneumococcus, but Darier finds that even in infective ulcers due to that organism the results obtained by the antipneumococcic serum are in no way superior to those obtained by the anti-diphtheritic serum of Roux-Behring.

Having seen the favourable results of injections of anti-diphtheritic serum in infective ulcers of the cornea, Darier had the idea to try the same treatment in numerous other ocular infections, including superficial, deep, endogenous, exogenous, traumatic, and post-operative affections.

In all the cases where he has had to employ the serum of Roux, he has been amply satisfied and he has nearly always obtained a more or less marked arrest of the infective process with a rapid cure or at least a marked attenuation of all the morbid symptoms.

In infective ulcers, taken at the beginning, the healing is rapid and complete and the cicatricial leucoma is often less extended and more transparent than that obtained by any other treatment.

When the corneal ulcer is more advanced, serotherapy leads to a lessening of pain, to an arrest more or less marked of the ulcerative process, but to effect a complete cure the usual topical applications must also be made use of.

Penetrating infective wounds of the cornea, of the ciliary region, or of the sclerotic, with signs of evident irido-cyclitis, even with traumatic cataract, when taken in hand early, are speedily cured by three or four injections of 10 cc. of serum. In infective conditions (happily rare) after operation for

cataract the results have been excellent when the treatment has been commenced early. During the past four years Darier has employed this serum in many and varied infections and he has never met with one which did not benefit by it.

He has come to have such confidence in this serotherapy, anti-infective but not specific, that he has operated in cases of cataract complicated by purulent dacryocystitis, or by chronic blepharoconjunctivitis. Except in very special circumstances he does not employ the serum prophylactically, but reserves it for use on the appearance of the first signs of infection, as the serum after being used for a time loses its effect.

Darier thinks that the action of the serum may be explained thus: When one has actively immunised a healthy animal against a toxine as violent as that of diphtheria or tetanus, all its anatomical elements, fluid and cellular, are placed in a state of defence, distributing abundantly in the circulatory stream, each according to its means, phagocytes, anti-bodies, anti-toxins, immunisines, bacteriolysines, and other elements still unknown to us. The glandular elements, liver, spleen, lymphatic glands, etc., as also the nervous, muscular and bony tissues, are in a state of organic hyperactivity, and one can conceive that the serum of such an animal will be rich in defensive elements of all sorts, and injected into an individual, the subject of an infective malady, will enable him to combat that infection without in reality invoking antitoxic action. Anti-diphtheritic serum has shown itself so far to be more efficacious than anti-pneumococcic, anti-staphylococcic, and anti-streptococcic serums, probably because the toxins of these microbes are less constant and less virulent.

Darier, whilst recognising the therapeutic properties of normal horse serum holds that it is much less energetic than the antitoxic serums of diphtheria or tetanus.

Serotherapy is usually innocuous, but it must be remembered that from 2-3 per cent. of individuals do not support it well and present exanthematous rashes, accompanied by weakness and temporary albuminuria. Another inconvenience is that this method of treatment cannot safely be applied to the same person a second time. He remains for months in a condition of heightened sensibility, in which state a new injection may provoke a violent reaction.

To avoid such accidents Darier has recently been administering anti-diphtheritic serum by the mouth and finds the

therapeutic results to be equally favourable and so far without any ill effects; he has even given two courses of the treatment at an interval of six months without any phenomena of sensitiveness showing themselves.

Darier's very interesting papers are accompanied by the clinical records of many of the cases treated.

E. M. LITHGOW.

DARIER. **Sodium Iodate in Secondary Glaucoma.** *La Clinique Ophthalmologique*, July, 1908.

SCHIELE has lauded subconjunctival injections of Iodate of soda of $\frac{1}{1000}$ on account of its analgesic and resolvent qualities. In iritis and glaucoma he has obtained a marked lessening of the pain and a diminution of the hypertension, and he supposes that there is a formation in the ocular media of nascent iodine with its powerful action on rheumatic, syphilitic, and tuberculous affections.

Darier has found that in several cases of secondary glaucoma, a single sub-conjunctival injection of a milligramme of Iodate of soda has led to a rapid clearing of the cornea, a more or less complete cessation of pain and a marked diminution of intra-ocular tension, and he has also found that this anti-glaucomatous action although very marked for iodate of sodium is not appreciable for potassium iodide.

Darier describes eleven cases in which he has used iodate of soda in this way, and the conclusion he draws is that we possess in this drug a specific agent against secondary ocular hypertension. It cannot be relied on in essential glaucoma, indeed in such cases the injection of the Iodate may provoke an acute attack.

E. M. LITHGOW.

DORFMAN. **On the Pathogenesis and Therapy of Tower Skull.** *v. Graefe's Archiv fur Ophthalmologie*, 68, 3.

IN this paper the author gives an account of three cases of this malformation in which optic neuritis followed by atrophy was noted. In only one of the three was there any indication of the presence of rickets. In the second case, as there was evidence of increased cranial pressure, *i.e.*, headache and restlessness, a piece of bone was removed from the right temporal region. This was followed by a considerable hernia. The

swelling of the optic discs diminished by one diopter, and the child's general condition was improved. As the observations only reach to a period three weeks after the operation, the author seems hardly justified in concluding, as he does, that by opening the skull the excessive intracranial pressure with the consequent injury to the optic nerve can be relieved. An account of the anatomy of these skulls, derived from specimens in the Vienna Museum, and from skiagraphs of the author's own cases, is well illustrated from the accompanying plates.

No new light is thrown on the causation of the malformation.

The bibliography appended is far from complete and makes no mention of any of the English authors who have dealt with this subject.

E. E. H.

A. BOTTERI. **Idiopathic Iridochoroiditis Simulating Sympathetic Inflammation.** *v. Graefe's Archiv für Ophthalmologie*, 69, 1.

THIS paper deals with a class of case, which Fuchs had previously referred to, in which the pathological anatomy strongly resembles that of a true sympathetic ophthalmia, but which still must be classified as chronic iridocyclitis of another type. Two cases are described. The first was an eye which had suffered from a recurrent iridocyclitis for 4 years; the vision was lost, an iridectomy had been performed to relieve tension. Enucleation was finally performed for a painful soft eye. The chief interest lay in the uveal tract, which was infiltrated by epithelioid and giant cells showing a tendency to organise into nodules, without any necrotic patches. The giant cell groups were more marked in the inner uveal layers, and the outer parts were infiltrated with round cells. There was some plastic exudation on the surface of the iris.

In the second case the condition of the enucleated eye was almost exactly the same, but here the other eye was also affected. In neither case was there a perforating wound.

A case by Kitamura is also quoted. It appears to be conclusively proved by this paper that there is a form of chronic iridocyclitis which is not sympathetic, and does not follow a perforating wound, which may affect both eyes, and which cannot be distinguished histologically from a sympathetic ophthalmia. The cases, however, must be of extreme rarity.

ANGUS MACNAB.

EDMUND-JENSEN (Copenhagen). **Retino-choroiditis Juxtapapillaris.** *von Graefes Archiv.*, 69, i.

EDMUND-JENSEN has had four cases of retino-choroiditis occurring in the near neighbourhood of the disc during the last ten years.

The patients were all young and apparently perfectly healthy, with no evidence or history of syphilis.

The ophthalmoscopic picture showed a white oval swelling about the size of the disc and in contact with it. The retinal vessels in the situation of the swelling were more or less obscured by it. The vitreous usually showed some opacities. The field of vision in every case showed a blind sector extending outwards to the periphery and corresponding at its apex with the position of the swelling. The central vision was not affected except to a slight extent from the vitreous opacities. The patients were kept under observation and the swelling slowly subsided, so that at the end of two or three months only a somewhat pigmented scarred area remained. The defective sector in the visual field was permanent.

One patient had a recurrence of the inflammation at the same spot as the original attack $2\frac{1}{2}$ years later and a third attack 5 years after the second. Dr. Jensen, in discussing the cause of the condition, points out the obvious explanation of the relationship of the swelling to the defective section in the visual field, viz.: that the latter is due to an obliteration of a branch of the arteria centralis. In his opinion the vascular disturbance is a secondary condition due to pressure by the swelling on the underlying arterial branches. After the swelling had subsided the vessels then exposed were seen to be very small but they were not obliterated and blood appeared to be still circulating. If the obliteration of the arterial branch is considered to be the primary disease a more diffuse oedema of the retina would result and not a small localised swelling, also after subsidence the vessels would appear as mere threads. The condition was met with only four times in ten years out of about 26,800 patients. Dr. Jensen's theory is no doubt the correct one, that the swelling causes so much interference with the arterial circulation that the retina supplied by the vessels involved becomes functionless. He does not suggest the possibility that all of these cases are instances of solitary tubercle. Three excellent coloured plates accompany the text.

E. W. BREWERTON.

STOEWER (Witten). **A Case of Partial Gangrene of the Lid with Consequent Haemorrhagic Diathesis.** *Klinische Monatsblätter für Augenheilkunde*, July, 1908.

THE case cited is that of a three year old child in whom a small ulcer developed on the right lower lid margin. The child had just recovered from measles. A few days after the ulcer was noticed the lower lid became much swollen and the skin over it dark blue in colour. At the same time there was a constant trickling of blood from the lid aperture. Examination under chloroform showed that the bleeding came from the general conjunctival surface, no eroded spot being found. Compression failed to stop the bleeding and Dr. Stoewer contented himself with a light application of nitrate of silver to the conjunctiva and the use of a wet dressing. Within the next few days the submaxillary lymph glands became much swollen and hæmorrhages were observed on the mucous membrane of the tongue and in the skin. Eventually the child made a good recovery and though a triangular area sloughed from the edge of the lid little deformity was left. Stoewer looks upon the whole process as a local and general sepsis due to the staphylococcus aureus which was found present in the lid ulcer. There was no suspicion of hæmophilia and Dr. Stoewer considers that the hæmorrhagic tendency was the effect of the septic process. The disease ran the course of a case of typical morbus maculosus Werthoffii (purpura hæmorrhagica).

Cases of severe diffuse bleeding from the intact conjunctiva must be very rare.

J. V. PATERSON.

H. HERBERT. **Cataract Extraction.** London: Baillière, Tindall and Cox. 1908.

SEVERAL books have appeared during the last year or two dealing with operations upon the eye generally, and of all the operations, extraction of cataract, being surely from several points of view the most important, deserves, if any does, to have a volume dedicated to it alone. Col. Herbert, I.M.S., is a surgeon of great, one might almost say vast, experience in this connection, and this experience he places at the command of other surgeons in a volume of about 400 pages, embellished with nearly 100 illustrations, these being largely constructed from actual photographs of the eye of the patient

and the hands of the surgeon while the operation is in process.

But a surgeon may have great numbers to deal with, may perform thousands of operations, and yet be unable to give any message to his fellows of less or equal experience, unless he has a well-balanced judgment, an open mind, a thorough knowledge of what others are doing and of their reasons for their actions, together with a humble spirit as critical of himself as of others. These great and necessary qualifications Col. Herbert possesses to an eminent degree, and this fact enhances enormously the value of the great clinical experience of the surgeon to the Cowasjee Jehangir Hospital of Bombay. It may not be known to all surgeons in this country and the Continent that in India the numbers dealt with are vastly in excess of what is the case here, and a surgeon in India may extract more cataracts in a month than a fairly busy colleague in Europe may do in a year. In other respects, too, their work may be necessarily somewhat diverse; they have patients of a different type with whom to deal, the climatic conditions are quite dissimilar, while the ancient customs of the races, more rigid than any laws, and their outlook upon disease, upon treatment, and upon the medical adviser, possibly also their reaction to drugs, are all essentially different.

The operation, as conducted by Col. Herbert, is described with the utmost precision, with almost meticulous care, and with the greatest lucidity, from step to step, from start to finish; possible, likely, and unlikely, difficulties are all considered, as well as the means of avoiding them, or of dealing with them should they occur, all important matters being illustrated by photographs or diagrams, so that the dullest reader cannot fail to understand; the precise situation, form, means of formation, etc., of the flap are explained in minutest detail, and the same is done with the other steps in the operation. It is hardly to be supposed that any two surgeons use precisely identical methods all through, nor would such be desirable, for they are different *men*, and one could therefore criticise unwisely the exact procedure of the author. Some surgeons, for example, disapprove of Col. Herbert's conjunctival flap, while others (among these latter the reviewer) are as strongly in its favour: the author, we might suggest, is almost too finikin about its form and situation. But Col. Herbert is too broad-minded a man to suggest that his method is the only possible correct one—he describes with care the

more important deviations of other notable operators from his plans, and he states frankly and fully the objections not only to their procedure but to his own.

One or two points of peculiarity in regard to "minor" matters (if one may call them so), will strike the reader, perhaps the principal one being the freedom with which corrosive sublimate lotion is employed in the strength of $1/3000$. With us that would cause severe reaction in far too many cases, but Col. Herbert justifies his conduct so far as regards Bombay alike from the fact that the native conjunctiva is so frequently in a very unclean state, that the reaction is very very rarely excessive, and that by this means (united to others) he has been able practically to banish suppuration from his practice. The justice of this statement will be manifest when it is mentioned that during his last "period of work," from October, 1904, to April, 1907, he performed 1,655 extractions without a single suppuration. This is indeed a noble record when one takes into account the many difficulties and pitfalls which beset the operator and his patients, and the patience, vigilance, zeal and skill required to secure it.

Another circumstance is the apparent frequency with which eyes came before his notice requiring extraction in presence of great destruction and scarring of the conjunctiva from trachoma, which necessitated altered methods of attack—on occasions by the subconjunctival operation of Czermak.

If there is one real criticism which might be offered, offered however with diffidence in the presence of the splendid record mentioned above, it is that Col. Herbert is too dependent upon the aid of assistants. For himself, the reviewer regards the intervention of an assistant as an unnecessary and therefore uncalled-for risk. An assistant, however well trained, is a different personality, and cannot always think and act in absolute unison with his chief, and except in rarest circumstances it is never really necessary that he should touch the eye at all, certainly never in a "normal" extraction; the reviewer has always felt that as regards the actual operation (apart from preparation of the instruments, irrigation apparatus, etc.) it is best that one should depend absolutely on oneself alone.

There are numberless points in this admirable book of which one might take note and which one might discuss, now with heartiest concurrence, now with friendly divergence, but it is

not needful to do so now. No surgeon, however experienced, will find the time lost which he spends in careful study of Col. Herbert's book; he will rise from its perusal with the sensation of having been in contact with a scientific and a receptive mind, with a man earnest to do his duty towards those who have placed confidence in him, by finding out the truth carefully and from every source, and by following it earnestly with no blind self-confidence but with a critical self-reliance which carries conviction.

If this review is longer than those which we are in the custom of giving to text-books and works of that kind it is because this volume is not a compendium of what is the common property of all ophthalmic surgeons but an original record and careful enquiry into the best methods of conducting a procedure of enormous importance to thousands of persons every year.

**A. MONTHUS (Paris). *Iconographie Stéréoscopique Oculaire*.
Part I. Masson & Co., Paris, 1908.**

Dr. MONTHUS has conceived the idea of illustrating various pathological conditions of the eye and certain of the operative procedures adopted, by means of stereoscopic photographs, and of the volume which will eventually be completed the present portion is the first section. It consists of 25 plates, each plate being of course double and being adapted for use with the stereoscope. The subjects illustrated are the orbit, in a physiological condition and when attacked by tumour, epibulbar new growth, tarsorrhaphia, probing of the nasal duct, excision of the sac, etc. In the accompanying text, Monthus has been careful to keep strictly to a description of the plate and what it shows. The patients from whom the plates were made were mostly from Panas' clinique, the influence of that master's teaching being everywhere manifest in the little book.

CLINICAL NOTES.

TREATMENT OF TRACHOMA BY THE FINSEN LIGHT.—Dr. Lundsgaard, of Copenhagen, has treated a small number of cases by the Finsen light, only one of them, however, being a fresh case of acute trachoma. In the earlier experiments he employed sittings of 15 minutes duration, and continued them for some weeks, but he afterwards found that shorter and fewer sittings sufficed. The disappearance of the granulations did not begin till three or four days after the commencement of the treatment. His most striking results were obtained with cases of well-marked follicular conjunctivitis. These received but one application of 5 minutes duration, and the granulations began to fade about the fourth day and were gone by the tenth. He concludes that the adenoid deposits in the conjunctiva are more amenable to removal by the Finsen treatment than any other pathological tissue, and that some forms at least of trachoma are curable by the light treatment.—*Klinische Monatsblätter für Augenheilkunde*, June, 1908.

AN UNUSUAL OPERATION FOR CATARACT.—Not many surgeons can have extracted cataract for a rhinoceros, but we are given to understand that this procedure was satisfactorily carried out on the person of a rhinoceros in the New York Zoological Gardens. The animal consumed 900 grammes of chloroform and 200 of ether before narcosis was sufficiently deep, and in the process several of the attendants were nearly overcome. Dr. Mater, Lecturer on Ophthalmology in the Veterinary College, was the operator, and the assistants included fourteen well-known surgeons and veterinary surgeons, six journalists, three photographers, and ten attendants from among the staff of the Gardens. One great difficulty which had to be contended with was to keep watch upon the heart of the unwieldy patient, for his skin was so thick that no pulse was perceptible by ordinary means. The operation lasted in all about half an hour, and was successful, we are given to understand, which is far from always being the case in the lower animals.—*Wochenschrift für Therapie und Hygiene des Auges*, xi, 42.

THE ACTION OF COCAIN ON THE PUPIL.

By E. E. HENDERSON and J. HERBERT PARSONS.

IN 1885 Jessop did some valuable experiments on the action of cocain upon the pupil, which were published in the *Proceedings of the Royal Society*. Amongst them, he divided the sympathetic nerve in the neck in two rabbits and removed a piece, the length of which is not stated. From 100 hours up to two months the pupil remained smaller than that on the opposite side and did not react when cocain was instilled into the conjunctival sac. He also noted that cocain caused dilatation of the pupil of a normal eye immediately after excision. He found no reaction to cocain in a case of sympathetic paralysis, and this observation was confirmed by Nettleship and others. From these results it was concluded that cocain acts locally on the nerve endings of the sympathetic in the iris.

In the light of our knowledge of the cervical sympathetic nerve, and its mode of termination in the iris, these experiments did not appear to be easy of explanation. The fibres of the cervical sympathetic end in arborisation around cells in the superior cervical ganglion. The ganglion cells give off axons which pass to the iris and supply the dilatator iridis muscle. Now, if cocain acts by stimulating these nerve endings, one would expect it to continue to act after section of the cervical sympathetic and only to cease to act after removal of the superior cervical ganglion, and even then only after sufficient time had elapsed for the nerve fibres to degenerate. We therefore considered it worth while to repeat the experiments. We operated upon two rabbits and a cat.

In the first rabbit the left cervical sympathetic nerve was exposed in the neck under chloroform and a piece 2 cm. long removed at 5 p.m. on November 17th, 1905. On the following morning, at 12-30 p.m., both pupils reacted to light. The right was 8 mm. in diameter, the left 5 mm. Repeated instillations of cocain into the conjunctival sac caused the right pupil to dilate to 11 mm., but produced no effect upon the left. The reaction was

tested repeatedly at intervals of days and weeks with the same result. The animal was killed on December 15th, 1907, *i.e.*, two years after the operation. The rabbit was anæsthetised, and Sir Victor Horsley kindly stimulated the corpora quadrigemina. Stimulation of the left anterior corpus quadrigeminum caused no effect upon the pupil; stimulation of the right corpus quadrigeminum caused the right pupil only to dilate.

In the second rabbit the left superior cervical ganglion was removed under chloroform on November 20th, 1905, at 5 p.m. On the following morning the right pupil measured 9 mm., the left 5 mm., in diameter. Repeated instillations of cocain into the conjunctival sac caused the right pupil to dilate to 12 mm., but produced no effect upon the left. The animal is still alive and healthy. There has been no appreciable change in the condition.

In the third animal, a cat, the right sympathetic ganglion was removed under chloroform on January 29th, 1906. Owing to paralysis of the nictitating membrane, observations on the pupil with cocain were difficult. The conditions were, however, quite comparable with those obtained in the rabbit. In March, 1908, the right pupil was smaller than the left, and no dilatation of the right could be obtained with cocain. The cat was killed in March 1908. Sir Victor Horsley stimulated the cortical motor centres. No dilatation of either pupil was obtained. Both pupils dilated slightly (?) under the influence of stimuli applied to the anterior corpora quadrigemina. During the induction of anæsthesia the right pupil suddenly dilated to an extreme degree, although at the commencement of the operation it was considerably the smaller of the two. This dilatation is the paradoxical dilatation of the denervated pupil, which has been studied so exhaustively by Anderson. The dilatation persisted throughout the experiment, though in somewhat less degree, sufficiently however to render any further dilatation as the result of stimulation difficult to determine.

It will be seen, therefore, that these experiments confirm the results obtained by Jessop and extend his observations by showing that the result is the same whether the cervical sympathetic alone is cut or the superior cervical ganglion removed. They further show that the result is permanent, at any rate for more than two years.

We are not prepared to bring forward any very satisfactory explanation of the phenomenon. It is extremely difficult to account for the immediate abolition of the cocain reaction, *i.e.*, long before ordinary degenerative changes can have been set up in the nerve. Moreover, in simple excision of a portion of the cervical sympathetic, ordinary degenerative changes do not occur in the peripheral ganglionic neuron, though that is not the same as saying that other pathological changes are not set up. It may be that the withdrawal of tonic impulses, which we know to occur in the dilatator tract, causes changes in the chemical constitution of the nerve endings, changes which have recently been the subject of investigation by Langley. The altered constitution of the nerve ending may be such that cocain can no longer combine with the new products. Another explanation is that the constricted condition of the pupil places the dilatator muscle at a disadvantage. The size of the normal pupil is the resultant of tonic light reflex impulses through the third nerve and tonic sensory impulses through the sympathetic. It is possible that cocain is unable to originate a stimulus, but can further stimulate the already contracting muscle. None of these explanations appears to us to be very satisfactory, but of them, the first seems most probable.

A NEW FORM OF SCOTOMETER.

By P. C. BARDSLEY.

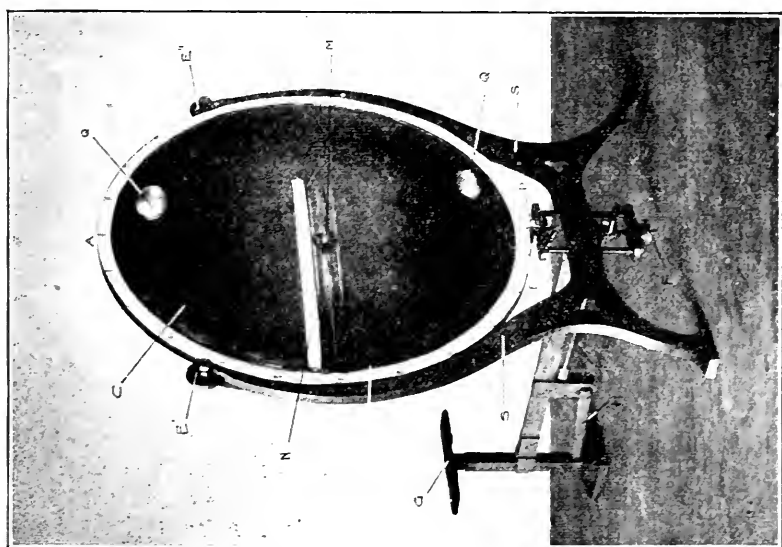
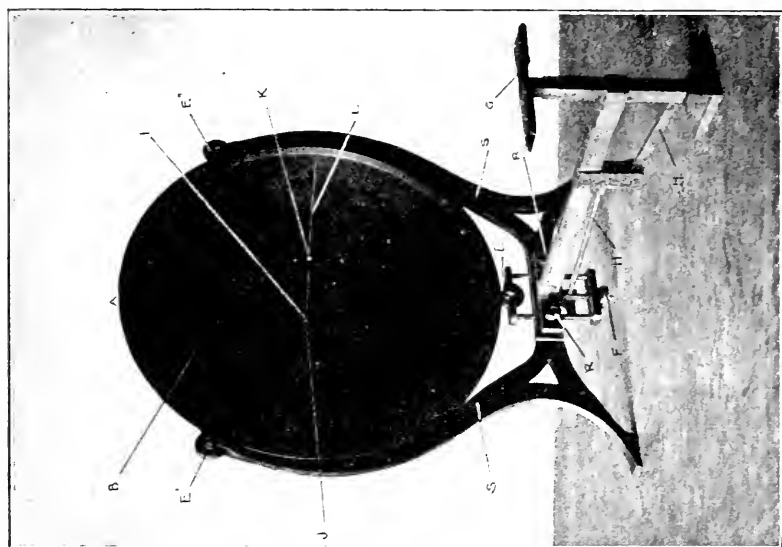
THE purpose of this instrument is the detection of very small losses of visual function, especially in the more central part of the field.

The patient gazes into the dull blacked section of a hollow sphere—a miniature Bjerrum's screen—with a central fixation disc. The surgeon sits behind the sphere and is hidden from the patient. There is nothing moving except the test object, no carrier to reflect the light or to make a noise, nothing to distract the patient's attention. In the fixation spot there is a minute hole: through this the surgeon can watch the eye of the patient continuously, and can immediately detect the slightest deviation on the patient's part.

It is hoped that this instrument will show with more ease and accuracy than heretofore:—(a) The island and ring scotomata of chronic glaucoma, retinitis pigmentosa, etc. (b) The central scotomata, for colours and for white, of disseminated sclerosis, retrobulbar neuritis and toxic amblyopia. (c) Also, in expert hands, earlier changes than are at present detectable in the function of the retina in tabes, insular sclerosis, and other diseases.

DESCRIPTION OF PLATES.

- A. Section of hollow sphere.
- B. Concave surface of same.
- C. Posterior convex surface of same.
- E, E', E''. Small wheels on which sphere rotates.
- F. Milled nut for raising or lowering E.
- G. Chin rest, raised by H.
- H. Rod and pivoted crank bracket.
- I. Fixation spot (6 mm.).
- J. Central hole in same.
- K. Disc of variable size and colour sliding in L.
- L. Very fine slot.
- M. Carrier knob for moving disc.
- N. Scale of degrees (radial).
- O. Scale of degrees (circumferential).
- P. Index hand for marking O.
- Q. Knobs for rotating A.
- R. Milled nuts for taking stand apart for packing.
- S. Lyre shaped stand for sphere.



REVIEWS.

T. AXENFELD (Freiburg). **Reclination by Scleromyxis Anterior after Preliminary Iridectomy.** Report of the Heidelberg Ophthalmological Congress, 1907.

THAT there may be circumstances under which it is at least doubtful whether the cataractous lens should be extracted may readily be conceded, the difficulty comes in knowing exactly what these circumstances are and in deciding what to do when they are present. Most people will agree that when one eye has been lost by expulsive hæmorrhage or by escape of a large quantity of fluid vitreous and conditions point to the probability of the same accident occurring again, some other means of relief should be sought. What of cases however in which the conjunctiva is in a very impure state and the patient is feeble and decrepit? Probably in the majority of these it will be found possible so to clean up the conjunctiva that the risk of extraction may well be run, but there is a residuum of cases in which extraction is too great a risk. What about cases in which the patient suffers from extreme mental unrest and excitability? Most surgeons would prefer to operate with the patient under an anæsthetic, and now that we have so copious a repertory of powerful and harmless narcotics such as scopolamin, morphia, or paraldehyde in large doses one of these could be used to keep him quiet for a number of hours after the actual operation.

Scleromyxis (or keratomyxis) is at best an operation by no means looked upon with great favour under any such condition because, apart from the danger of infection there is serious risk of glaucoma, iridochoroiditis, and detachment of retina. And reclination is not an operation which has great attractions at any rate, for the disturbance of vitreous humour and the serious nature of the attack upon the eye alike render it unpleasantly uncertain in its final results.

During the last little while Axenfeld has seen four cases in which the first eye being lost as the result of operation it became necessary to consider very carefully what the course of procedure should be in regard to the second. In one of these instances the patient was an extremely feeble man of 80, whose mental condition was very unsatisfactory, who had threatened

suicide shortly before, and who came to Axenfeld with over-mature cataract and a very unclean conjunctiva. Extraction with iridectomy was followed by panophthalmitis, caused by the fact that the cornea sank in, even without any loss of vitreous, the wound gaped open and could not be closed by a suture owing to the feeble mental and bodily condition of the patient, and septic infection followed. While the patient was under a general anæsthetic for the purpose of evisceration of this lost eye, iridectomy was performed upon the second—the utmost care being taken, of course, to prevent infection of it. This was done to minimise interference afterwards, and though the patient had had no cocaine, and the vessels were therefore not artificially contracted, yet even here the cornea fell into folds. Nevertheless the iridectomy fortunately healed up quite well.

It was quite plain then that extraction, especially in view of the feebleness of tissue-nutrition in the patient, would almost infallibly prove a failure, so Axenfeld decided to perform reclination by scleromyxis anterior. One advantage of this method was that by working in the area of pupil and coloboma the operator was able to watch and to gauge exactly the amount of effect upon the lens, to know exactly what he was doing, provided he made the puncture in the corneo-scleral junction and close in front of the iris, and laid the flat side of the needle on the part of the lens exposed in the coloboma. By this means he was able to depress the lens, pushing right down to the level of the lower edge of the pupil but at the same time injuring the vitreous as little as possible. When couching the lens one does not need to aim at its complete disappearance from the pupillary area if a preliminary iridectomy has been performed, for the coloboma can be utilised for visual purposes even if the true pupil is not clear of lens, and this fact enables one to be content with a gentler procedure.

This preliminary iridectomy then gives one facility to accomplish couching of the lens with less risk and better prospect of success. It may be admitted that the performance of iridectomy is itself a danger in the very cases in which the operation is required: this is true, but an iridectomy wound properly placed and cleanly made is very little liable to septic infection, is only a relatively trifling procedure in a case in which the larger operation might gravely upset an unstable mental equilibrium, and is not liable to be followed by hæmorrhage

even in a patient in whom bleedings are likely to occur, provided, as Sattler has pointed out, cocain, with its injurious influence on unhealthy vessels, is not employed.

It is quite true that preliminary iridectomy even has been followed by an expulsive hæmorrhage, but putting aside cases of glaucoma, if the portion excised is small and the incision not too peripheral, and if cocain be not administered, such an occurrence must be of excessive rarity. There is the further possibility (apart from glaucoma) of pernicious anæmia being present, when severe hæmorrhage might take place after iridectomy.

In 1902 Bourgeois recommended that reclination should be preceded by iridectomy, but his motive was simply to prevent the occurrence of glaucoma, and he performed his reclination operation in the customary manner through the sclerotic, so that his operation differed in some important respects from the present. Axenfeld's method is to introduce a needle curved somewhat on the flat, whose stem closely fits the wound caused by the point so that no aqueous may escape—a matter of great importance in this operation. The needle is made to enter at the periphery of the cornea and in the scleral limbus. In order to avoid risk to the iris it is passed in with the concavity forwards; care must at the same time be taken that the cornea is not injured by the point. After the point is safely past the iris and in the pupillary area the needle is inverted so that it is convex forwards and the point is carried well up to the very periphery of the lens. The handle being then elevated the instrument causes the lens to bend over backwards or to descend; then one or two repetitions of the movement insure its permanent settlement in the new position. It is necessary to take the greatest care to ensure that the aqueous shall not escape; if it does, the operation will be a failure and will require to be repeated. So far as results are concerned it is obvious that not a great deal can be said. The operation is only performed under circumstances and in patients in whom a brilliant success could not be looked for, but so far as they go, Axenfeld has been well pleased. The method seems at least to offer a fair prospect of a good result where the usual operation would almost infallibly be a failure.

W. G. S.

G. LODATO (Sienna). **Certain Appearances. Hitherto Unrecorded, in Trachoma.** *Archivio di Ottalmologia*, August, 1908.

THE search for the ultimate *causa causans* of trachoma still goes on, and nowhere is it prosecuted with more vigour and patient earnestness than among our *confrères* in Italy. Prof. Lodato has by the use of Mann's method of staining succeeded in bringing to light certain appearances, the importance of which will be a matter for subsequent investigation, but which at all events he believes to be now observed for the first time. The appearance of the new bodies is that of rounded corpuscles, tinted of a purplish red, without any visible structure, varying in size from the minutest granules up to that of an erythrocyte: the largest ones very rare, the smaller and medium sized very much more frequent. Their situation in a trachomatous conjunctiva is for the most part in the adenoid tissue, but they are also to be found inside the trachoma follicles. When the large forms occur they are usually solitary, the smaller ones more frequently in groups like a bramble, and for the most part intracellular. In each of five cases the author has found the same formation in portions removed from the conjunctiva in trachoma. Leber some time ago described certain minute particles within the large phagocytes which are found in the follicles, but from these the particles at present under consideration differ in respect of form, position, and colour-reactions. These new bodies are not blastomycetes: they are not granular in structure, nor do they grow in the form of buds on branches, and they are not encapsuled. For another thing the majority of these new bodies are much smaller than blastomycetes, and when blastomycetes are subjected to the action of Mann's stain they turn pale blue and do not take on the violet or purplish hue seen in these trachoma particles.

Lodato is quite convinced that the presence of these particles is not indicative of cell infiltration, whether hyaline or colloid, since they are so regularly formed and grouped within the cell elements, and since also examination discloses the presence of a capsule formed in a condition of activity and not as a sign of cell degeneration. Hyaline-degenerated cells, too, as well as those undergoing colloid degeneration, are tinted of a comparatively vivid red by Mann's reagent, while those bodies are, as above mentioned, more violet, and they do not stain

with van Gieson's or Russell's reagents employed for hyaline degeneration.

What the precise signification of the presence of these bodies may be Lodato confesses himself unable meantime to say, but being now firmly convinced that their existence is not accidental and that their nature is different from that of similar known deposits, he intends to pursue investigations further in the human subject and in purposely infected animals: if these investigations should lead to more definite information regarding the origin of trachoma it will be great gain. Meantime his article is only intended as the "pegging out of a claim" for priority.

W. G. S.

SCHANZ and STOCKHAUSEN (Dresden). **How do we Protect our Eyes from the Ultraviolet Rays in our Artificial Sources of Light?** *v. Graefe's Archiv.*, 69, 1.

THE authors of this paper appropriately open the subject with an account of the personal experience of one of them of the effects of the ultraviolet rays on his own eyes. Dr. Stockhausen is a Doctor of Engineering, and in the course of some experiments on electric arc lamps he had occasion to watch the light almost uninterruptedly for half an hour. A few hours later his eyes smarted and he could not read the newspaper comfortably: the smarting increased, and the eyes became watery, red and swollen. During the night the discomfort was so great as to preclude all thought of sleep. In the morning, the lids were glued together and opening the eyes was extremely painful. Examination showed the vision greatly reduced, and a small spot of 'solarization' was visible in each retina, the evidence of which still remains as a small rectangular scotoma near the fixation point.

A noteworthy point in the case was that the arc light used in the experiment was enclosed in a glass globe and that the observer in addition was wearing his spectacles. It was this fact that led the authors to the enquiry as to how far we are justified in the view that the ultraviolet rays are absorbed by ordinary glass.

The first step was to determine the relative richness in ultraviolet rays of our ordinary sources of light. The eye of the observer is, of course, not an instrument which can be used for

this purpose; but a photographic plate answers the purpose admirably. The prisms used for dispersing the rays were of quartz and the lens system consisted of achromatic combinations of quartz and fluor spar. Thirty-six spectra of different sources of light are here shown, arranged in vertical series so as to be readily comparable.

The first illuminants in the series are the ancient Roman olive oil lamp, the sperm candle, the stearin candle, and the colza oil lamp; none of these shew any ultraviolet rays. A very slight extension of the spectrum into the ultraviolet comes with the moderator lamp, the addition of a chimney giving improved combustion and a hotter flame; but all these lights, as well as the petroleum lamp and the fish-tail and argand gas burners, may evidently for practical purposes be regarded as free from ultraviolet rays.

A marked change is seen when we come to the various incandescent mantle burners, whether the source of heat be gas, spirit, or petroleum. All these show a distinct extension of the spectrum into the ultraviolet. The acetylene flame gives a spectrum of very similar character. Slightly longer again is the spectrum given by the ordinary electric light, and no obvious distinction is apparent between the carbon filament and the various forms of metallic filament lamps. The Nernst lamp, which can be used without a globe, shows in that condition a much longer ultraviolet spectrum than the rest; with a globe, it falls into line with the other incandescent filament lamps.

A further change in the type of spectrum appears with the electric flame or arc lamps. There is not only a further considerable lengthening of the ultraviolet portion, but the visible portion, instead of presenting as heretofore a fairly uniform band, now shows a tendency to fading away of the red end and a maximum of intensity situated about the junction of the visible and invisible rays.

Last in the series is the mercury vapour lamp. This very modern illuminant seems to be coming to the front and has been strongly recommended for workrooms, especially for those in which very fine work is to be done, its peculiar, almost monochromatic, light bringing out contrasts very clearly. Its visible rays consist chiefly of two brilliant bands in the blue-violet, its invisible spectrum is nearly five times the length of the visible one and shows many intense bands in its course.

The second section of the paper, which concerns the injurious influence of the ultraviolet rays on the eye, may be passed over briefly, for the authors contribute little to our knowledge of the subject. They repeated the experiments of Widmark, who found that of the two eyes of an animal exposed to an arc light, the one covered by ordinary glass and the other by a quartz plate, the former showed little change, while the latter developed electric ophthalmia; but by giving a prolonged exposure (four hours) to a light rich in ultraviolet rays they showed that even a thick glass plate was insufficient to prevent entirely the development of ophthalmia, although it delayed and mitigated its symptoms.

They suggest that the ultraviolet rays play a part in the causation of senile cataract, adducing the fact that the rays cause strong fluorescence in the normal lens as evidence that they set up some change therein. But the fact that senile cataract most commonly begins in the periphery of the lens, where it is least exposed to light rays of any kind, is clearly a difficulty in the way of accepting this view.

In the third section they discuss the absorptive powers of various kinds of glass for the ultraviolet rays. Taking those which are commonly used for the chimneys and globes of lamps they show, by another series of photographic spectra, that none of them have more than a very partial effect in absorbing the invisible rays; the spectrum is shortened as compared with that of the naked arc, but a light still rich in hurtful rays is transmitted by all of them. A densely milky glass seems to have been the most efficient of those tried; clear glass, even when used in a thickness of 18 mm., was ineffective; nor does it appear that lead glass, even of the very heavy type that is used as a protection from x-rays, is any more opaque to the ultraviolet rays than ordinary glass.

Of the tinted glasses used for protective spectacles, the long used and still popular blue glasses allow the ultraviolet rays to pass with great freedom, even in the deepest tints. 'Bleu ardoise' and 'rosalin' are also quite permeable to these rays, and the same may be said of the lighter tints of 'smoked' glass, Nos. 2 to 4; it is only when the very deep tints, Nos. 7 or 8, which may almost be called black, are employed that we obtain a very marked shortening, even then not a complete disappearance, of the ultraviolet spectrum. Yellow glasses are dismissed

in a couple of lines as "somewhat shortening the ultraviolet spectrum," but examination of the two spectra given would lead one to think that the reduction produced by the yellow glass was decidedly more definite than that of any of the previously mentioned tints.

A glass which may be described as of a 'greenish-yellow smoke' tint was produced by Fieuzal, in France, 20 years ago, after observations on the effect of coloured light on the pigment movements in the retinal cells. Though not specially designed as a protection from ultraviolet rays (whose harmful influence was not then recognised) it appears from the spectra here given to be very fairly efficient in this respect. Another glass of very similar character is on the market under the name of 'enix-anthos' glass. To both of these, however, the objection applies that it is only when the tint is of such a depth as would preclude its employment for ordinary purposes that complete exclusion of ultraviolet rays is obtained.

Extensive trials of glasses of all colours and from various makers led the authors always to the same conclusion, viz., that no glass commercially obtainable could be relied on to do more than cut off the rays of shortest wave length, or under $300\mu\mu$. But these cannot be regarded as the only harmful ones, perhaps not even as the most harmful; it has been shown, for instance, in the use of ultraviolet light in dermatology, that while the rays of shortest wave length are especially liable to cause superficial dermatitis, the deeper effects are more readily obtained from the rays of greater wave length, 400 to $300\mu\mu$.

The authors therefore undertook practical experiments in the making of glass on their own account, and after numerous attempts, which at one time seemed likely to prove fruitless, they succeeded in producing a glass completely impervious to the ultraviolet rays. To this they have given the name of 'euphos' glass.

They reproduce a number of spectra showing complete absence of the ultraviolet rays from various sources of light when these are screened by globes of euphos glass, the most severe test being a five minutes exposure to a 10 ampère arc lamp covered by euphos glass eight-tenths of a millimetre in thickness; even in this case there is no trace on the plate beyond the limits of the visible spectrum.

Euphos glass has a light yellow-green colour, but the authors expressly state that it is not from its colour that it derives its

peculiar property of absorbing the ultraviolet rays. The illuminating rays are only slightly reduced by it, namely, to an extent of not more than 5 per cent. with glass of .5 to 1 mm. thick.

The importance of such an investigation as this is obvious. The tendency of all modern improvements in artificial lighting has been in the direction of producing more light for less expenditure of energy, and this has always been accomplished by a raising of the temperature of the glowing body to a higher and higher degree. But therewith has been introduced in ever increasing proportion the undesirable element of the more refrangible rays; until at last we are obliged to recognise that our most economically efficient source of light, the electric arc, is quite unfit for the human eye to work with. If a simple means could be found of ridding such lights of their hurtful elements a great step would have been made.

We are bound, however, to point out that the investigation here described seems to us open to criticism from two points of view. Firstly, the comparison of the spectra which forms the basis of the inquiry is vitiated by the fact that there is no real attempt to reduce them to a common quantitative standard. For example, in the first 20 spectra a uniform exposure of 10 minutes duration was given, while the luminosities varied from less than one candle power in the oil lamp to 77 candle power in the incandescent gaslight; to make the comparison of any practical value the lights should obviously have been reduced to a uniform luminosity per unit area.

The second criticism is of a different nature. The authors give us no indication whatever of the composition of the glass which they have invented; indeed they tell us plainly that it is to be fully protected by a patent; and without going so far as to imply that this may have influenced them in their interpretation of facts, we think it is to be regretted that the well-established rule which states that a medical man ought not to be concerned with any secret remedy should have been departed from in this instance.

W. G. L.

BIRCH-HIRSCHFELD. **The Injurious Effects on the Eye of Ultraviolet Rays.** *Zeitschrift für Augenheilkunde*, July, 1908.

In a former paper, published in 1904, Birch-Hirschfeld produced experimental evidence bearing on this subject.¹ The present paper is especially valuable on the clinical side.

The injurious influences observed are of three kinds. First there is an inflammation of the anterior parts of the eyeball, already well known as "electric ophthalmia" or—for it is essentially the same affection—as snow-blindness. Clinically, it takes the form of a mild conjunctivitis, but in experimental cases induced in rabbits the conjunctivitis may be very severe and accompanied by cloudiness of the cornea and iritis. The characteristic feature about it, whether in animals or man, is that it occurs very suddenly after a latent period of some hours during which there are no symptoms. It is noteworthy that in animals these symptoms are prevented by the interposition of ordinary glass between the source of light and the eyes.

In the second place, according to Widmark and Hess,² there is experimental evidence to show that ultraviolet rays have a definite prejudicial effect on the anterior epithelium of the lens. This part of the subject is only briefly referred to in the present paper.

Thirdly—and this is Birch-Hirschfeld's main subject—these rays appear to have a chromolytic action on the retinal cells, which in its early stages is analogous to what takes place during light adaptation, but which, when the intensity of the rays is high, produces definitely injurious effects on the retinal structure. In the case of animals this can be proved by microscopic investigation. In man it is inferred that analogous effects cause the phenomenon of erythropsia after snow or electrical blindness, though here it is uncertain how far the responsibility may not be shared by the visible rays of the spectrum. The inference is greatly strengthened by Birch-Hirschfeld's discovery that individuals exposed to the unprotected action of these rays develop *partial colour scotomata* which have certain very definite characteristics.

Four of the five cases observed were young men between the ages of 17 and 25. The age of the fifth is not stated. In each case the symptom followed a considerable period during which the patient had been working by the aid of a mercurial vapour lamp with unprotected eyes. In one case the lamp was the "Heraeus" lamp used in a clinical laboratory. In the other four cases the lamp was the "Uviol" lamp. The symptoms in all cases were very similar, viz., a certain amount of conjunctival disturbance accompanied by an affection of colour vision, taking the form of a para- or peri-central scotoma for red and green, central visual acuity and fundus appearances being

normal. The scotoma was always most marked in the lower and inner section of the field between 10° and 20° from the fixation point. In only two out of the five cases was central colour vision ever temporarily affected.

For the discovery and mapping out of these scotomata the most convenient appliance was found to be Priestley Smith's scotometer. In all cases the symptoms disappeared after a few weeks, during which the patient, without ceasing to work by the light of the lamp, wore protective glasses.

That the affection both of the conjunctiva and of the retina is due to the ultraviolet rays seems highly probable. The light of the lamps used is not specially brilliant but is specially rich in short waved rays between 250 and 300μ . In experiments on rabbits the conjunctival affection is prevented by the intervention of a thin plate of ordinary glass, and in the clinical cases, as already stated, protective glasses transparent to the light rays were sufficient to prevent all symptoms.

With regard to the production of a ring scotoma for colour, the writer refers to Hancock's opinion that such a phenomenon precludes an affection of the retina and points to one of the optic nerve.³ Birch-Hirschfeld admits no such conclusion, but suggests that the phenomenon of ring scotoma may be accounted for by the peculiar vulnerability of the retinal cells in the perimacular region due to their relatively poor blood supply.

As to the protective measures necessary to guard against the affection, the main question at issue is whether or not it is necessary to shield the eye from the rays just beyond the violet end of the visible spectrum, *i.e.*, between 300 and 400μ , or whether it is enough to cut off the rays of shorter wave length than 300μ . Birch-Hirschfeld and Hess agree that as far as the bad effects of the mercurial vapour lamps go it is sufficient to adopt the latter and easier plan. Ordinary glass appears to be a sufficient protection either as a lamp shade or as protective glasses provided that these are so constructed as to intercept the rays entering laterally as well as from in front. This is a point which should be specially noted by those engaged in the treatment of skin diseases by light or by x-rays. For some other sources of light—iron and magnesium for instance—it is admitted that special sorts of glass which absorb rays of longer wave length than 300μ may be necessary, but the position of Schanz and Stockhausen⁴ who maintain that it is the rays between 300 and 400μ which are chiefly responsible

for the injurious effect—to ward off which they recommend a special sort of glass called “euphos”—is not supported by anything in this paper.

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A. H. T.

VOGT. Eye Diseases due to Ultraviolet Rays, and their Prevention by a New Colourless Glass. *Archiv für Augenheilkunde*, June, 1908.

THE sort of glass recommended is a heavy flint glass with lead in it, transparent and colourless, but absorbing the ultraviolet rays from a wave length of $384\mu\mu$. It is made by Schott, of Jena. Its use is chiefly suggested for a lamp shade for electric or acetylene lamps in schools, factories, and hospitals, and for spectacle glass in cases of incipient cataract or chorio-retinitis, or in aphakia, where the eye is more exposed than normally to the bad effects of ultraviolet rays. In cases where dazzling or photophobia is a symptom it is advisable to have the glasses smoked, never blue.

A. H. T.

POULLAIN. The Use of Coloured Glasses in Intermittent Squint. *Recueil d'Ophthalmologie*, April, 1908.

THERE are certain cases of squint which are a trouble to the surgeon: the patients are young, there is perfect visual acuity in each eye, the eyes may be a trifle hypermetropic or may be emmetropic, the stereoscopic examination is passed with ease, but the parents of the young patients assert that when they are tired, or excited, one or other eye diverges. In such cases Javal was wont to order a shade to be worn over each eye alternately for some time daily.

Poullain has attempted to correct the tendency to this squint, and the suppression of the image in the divergent eye, by causing the patient to wear a coloured glass—red or blue—before one or other eye. The effect of the glass over one eye during binocular vision is to faintly tinge the images of

objects with that colour. Should one eye diverge and its image be suppressed, then the remaining image will be white or deeply coloured according as there is or is not a coloured glass before the eye that continues to fix. He instructs the patients to recall their wandering eye to its duty when such a change in the colour of the images takes place.

I have tried this recommendation on patients with this tendency to divergent squint on fatigue, and made some other experiments. I find that a coloured glass over one eye so reduces the illumination admitted into that eye as to disturb vision and increase the tendency to squint.

To avoid this I tried placing a coloured glass before each eye, one eye red, the other blue; the tints were light, and equal in the amount of illumination cut off by the colour. If the colour tints were well balanced and there was binocular vision then little if any disturbance of the colour vision occurred; but if a natural or artificially induced squint took place, then there was an instant alteration of the appearance of things: either there was vision of two sets of objects, one blue the other red; or else, with the suppression of the images of the squinting eye, the images seen were red or blue as according to the colour before the fixing eye.

Poullain's idea seems very good, and with the modification I venture to suggest, worth trying in serious cases. On the other hand my experience goes to show that these intermittent divergent squints do not tend to get worse or to become permanent.

N. BISHOP HARMAN.

GALEZOWSKI (J.). **The Treatment of Scars of the Cornea by Thiosinamine.** *Recueil d'Ophthalmologie*, June, 1908.

AFTER referring to the work of Mazet, Lemeigan, Sulzer, and Suker in attempting to reduce the density of corneal scars by the use of drugs, subconjunctival injections, and electrolysis, he gives his experience of the use of a drug first used for this particular purpose by Suker in 1902. Thiosinamine, or allyl-sulfocarbamide, is made by heating together two parts of essence of mustard, one of absolute alcohol, and seven of ammonia; there results a nearly odourless crystalline substance. It is but little soluble in cold water, but easily soluble in glycerine. Hebra in 1892 suggested its use for the reduction of lupus scars.

Thiosinamine is irritating to the eye, so the author used a mixture of equal parts of thiosinamine and antipyrine devised by Horeau and Michel. This combination is easily soluble in water, and a 5% solution is scarcely irritating to the eye, producing only slight redness. The eye is bathed with this once or twice a day for five minutes. Of 26 cases treated in this way, 9 showed a very notable amelioration, 11 'a sensible amelioration,' and 6 were unchanged. In the best cases the improvement in visual acuity was: 1 20 to 1 15; 1 4 to 1 3; 9/10 to 1 1; 1 3 to 1 2. For the most part the scars treated were the result of corneal ulcers; he has treated the effects of interstitial keratitis but finds these much more resistant.

There is no doubt that corneal scars are a constant source of surprise in the manner in which they clear up or become reduced to mere irregularities in density of the cornea. In not a few cases children whom I have received into blind schools owing to the serious effects of chronic phlyctenular keratitis, were, after continuous treatment with strong yellow oxide of mercury ointment and massage for three or four years, discharged with fair vision. Maekenzie narrates in his text-book a dramatic case of a man whose blindness from corneal scars was relieved when he was dying of acute phthisis, the improvement being apparently the result of the intercurrent inflammation. Some years ago I tried the effects of allyl oil and also of benzyl chloride, both pungent volatile oils of the sort which cause leucocytosis. The patients selected were those afflicted with dense scarring from interstitial keratitis. The drugs certainly had beneficial effects, but their action was painful.

Thiosinamine has been extensively used in general surgery, and it may be worth while extending the trial of it, or of the combination with antipyrine as employed by Galezowski.

N. BISHOP HARMAN.

MORAX. Ocular Affections in Human Trypanosomiasis.
Annales d'Oculistique, July, 1908.

In *The Ophthalmic Review* for March, 1907, will be found an account of the ocular affections met with by Morax in the different varieties of Trypanosomiasis in animals. They were blepharo-conjunctivitis with purulent secretion containing the parasite; lesions of the cornea (more often in the form of inter-

stitial keratitis) due to proliferation of the parasite in its interlamellar spaces: superficial ulceration of the cornea, occurring usually as a complication of the former condition; iritis and iridocyclitis, the parasite being found in the aqueous, iris and ciliary body: and oedema of the lids. Morax in this paper reviews the recorded cases of eye infection occurring in human Trypanosomiasis, and adds an observation of his own.

In Broden's case, quoted by Manson, an attack of iritis occurred in a man of 40, a year after infection, but it was so slight that no importance was attached to it, and no examination of the fundus was made. In Manson and Daniells' case atrophic choroiditis and pigmentary degeneration of the macular region were found with only slight diminution of vision. Würtz and Nattan-Larrier and Nattan-Larrier and Monthus saw iritis, the former an attack of some weeks duration, and the latter three short attacks.

In the case recorded by Morax in this paper an attack of iritis and one of cyclitis occurred in the first year of infection. So far the parasite has not been demonstrated in the affected tissues in the human subject, but it is highly probable from the symptoms observed, the unilateral and infectious character of the lesions and the analogy with similar diseases in animals, that the changes are due to a rapid proliferation of the parasite in the affected tissues. The eye affection has several times been observed simultaneously with an attack of fever and presence of the trypanosome in the blood. The benignancy and the relatively short time of development of the lesion seen to distinguish it from other chronic infections of the eye, such as tubercle, syphilis and leprosy.

J. BURDON-COOPER.

DE RIDDER. **Ocular Examination of Children Attending the Brussels Schools.** *Annales d'Oculistique*, July, 1908.

DE RIDDER has examined the eyes of some 2,820 scholars in the Brussels Schools and finds that 1,207, or 42·8%, of them had defective vision due to refraction error. Of this 42·8%, 21·5% were hypermetropic, 10% were myopic, and 9% were astigmatic. The author has also found (confirming the work of others) that neither hypermetropia nor astigmatism is increased by school work (between the ages of 6 years and 14

years the percentage of hypermetropes and astigmats remained fairly constant) but that myopia on the contrary increased to a marked extent with the age of the scholars. At 6-8 years the percentage of myopes was 5.5, at 9-10 years this had increased to 8.5, at 11-12 years to 10%, and between 13 and 14, the age at which the majority left school, the percentage of myopes had risen to 18. Similar statistics have been found in Germany and other European countries.

De Ridder suggests, and we agree, that it ought to be the duty of the oculist to examine, advise with regard to and prescribe for any defects existing in the eyes of scholars at the beginning of school life, and to keep under special observation those in whom any serious defect of vision is liable to result from school work.

It is somewhat surprising in view of all that has been written on the "Hygiene of the Eye," that so little has been done in this direction by those responsible. The subject is one which merits considerably more attention than has been bestowed upon it. Attempts have been made by oculists in some of the provincial towns of this country to start special schools for the education of the short-sighted, but the success attending them has certainly been anything but remarkable. The subject is none the less important, and our duty seems clear, viz., to keep the subject in prominence until something more satisfactory than the present arrangement is forthcoming.

J. BURDON-COOPER.

GILBERT (Munich). **The Relation of Marginal Atrophy and Peripheral Ectasia of the Cornea to Arcus Senilis and Chronic Peripheral Furrow-Keratitis.** *Klinische Monatsblätter für Augenheilkunde*, August, 1908.

THE relationship of the various non-ulcerative processes which occur in the marginal zone of the cornea is reviewed by Gilbert in the light of some cases which he has observed for a considerable length of time. One of the cases is of great interest as three stages of the same condition were found in different parts of the same cornea at the same time.

Gilbert's evidence shows clearly that the clear marginal furrow which stretches and distorts the cornea is, in some cases at least, preceded by an infiltration resembling an arcus senilis. The same lesion may occur either on the central or

on the peripheral side of an arcus already present. Position, therefore, is not a differentiating feature between Fuchs's "marginal atrophy" and Schmidt-Rimpler's "furrow-keratitis." Gilbert would identify these lesions, and describes three stages in their development: (1) "a superficial greyish corneal opacity, resembling a primary arcus"; (2) "a furrow with its base becoming transparent"; (3) "a perfectly transparent furrow commencing to bulge."

Takayasu has shown that in a typical arcus the fatty degenerative process passes further into the cornea than is apparent clinically; and as in arcus senilis there appears to be a constant slight atrophy of the cornea peripheral to the opacity, Gilbert appears to be justified in his conclusion that these forms of marginal atrophy which he identifies are secondary to a change identical with, or similar to, arcus senilis.

ANGUS MACNAB.

GILBERT (Munich). **On Pannus Degenerativus and Keratitis Bullosa.** *v. Graef's Archiv.* 69, 1.

THIS article constitutes the first of a series of papers dealing with the degenerative affections of the cornea. The author divides the degenerative processes to which the cornea is liable into two main groups: (1) consisting mainly of the destructive changes in pre-existing tissue, as a direct result of raised tension, and the secondary reparative processes therewith connected; (2) containing all those appearances which, as a result of anatomical investigation, are found to owe their origin to the deposit of products of a locally disturbed and perverted nutrition, such as zonular keratitis and leucomata with calcareous or hyaline degeneration. The changes in the second group are also frequently but not exclusively found in eyes blinded as a result of increased tension or iridocyclitis. Pathological processes which are connected with both groups are not infrequent, but one group or other usually predominates.

The present article only deals with the first group. Serial sections were cut of half the cornea in six cases in which the eye had been removed with corneal changes following on old glaucoma. A very minute account of the conditions underlying pannus degenerativus and keratitis bullosa is well illustrated by microphotographs. It would be impossible within

the limits of a review to epitomise the author's account and those interested in the subject would do well to consult the original paper. The author points out that keratitis bullosa may originate either as a raising up of the whole epithelium by a collection of fluid or in the epithelium itself as a result of degenerative changes. In neither case is there any evidence of an inflammatory process, nor does degeneration of Bowman's membrane play any part in its production.

The production of a homogenous layer of connective tissue between the epithelium and Bowman's membrane is stated to be secondary to the formation of the vesicle and to be really evidence of an attempt at repair. As evidence of this the author points out that in those sections in which the formation of vesicles was well marked the pannus formation was exceedingly scanty; whereas on the other hand when this latter formed a thick membrane, vesicles were absent.

An account is given of the work of other authors on the subject, and a bibliography is appended.

E. E. H.

MARTIN ZADE (Leipzig). **Diplobacillary Ulceration of the Cornea.** *Klinische Monatsblätter für Augenheilkunde*, August, 1908.

ZADE records in detail the appearance and progress of 25 cases of corneal ulcers in which the Morax-Axenfeld bacillus was obviously the infecting agent. The Petit type occurred in 3 of the 25. The ulcers were of the single centrally situated type, which occurs in cases where there is no evidence of an angular conjunctivitis. In regard to the very important question of the differential diagnosis of these ulcers from the pneumococcal variety Zade says that "when a diplobacillary ulcer is watched throughout its whole course it will be found to have quite distinct characteristics"; he considers that a typical appearance cannot however be described. The features which are most regular are a circular disc-like outline, and a base covered with slimy grey debris. The margin may resemble that of the pneumococcal ulcer, but the infiltration is neither so opaque nor so deep. The infiltration in the cornea around may be in the form of radial or concentric lines. The hypopyon is not so yellow in colour. The spread is by an advancing margin which is not so deep as that of a pneumococcal ulcer. Regard-

ing treatment. Zade fully agrees with previous observers as to the almost specific action of sulphate of zinc. "The best results are obtained by early treatment with zinc." The Freiburg treatment is recommended: compresses of 3:1000 zinc sulphate solution applied for several hours at a time, drops of $\frac{1}{2}$ per cent. zinc sulphate instilled every half hour, and between times, as at meals, and for the night, an ointment containing 1.5 per cent. ichthiol and $\frac{1}{4}$ per cent. zinc sulphate was introduced into the conjunctival sac. The cases show that this treatment gives equally good results as regards the ulcerative process and leaves a slighter scar than the cautery.

The whole article is a striking testimony to the value and necessity of a bacteriological examination in all cases of corneal ulcers which resemble the so-called *ulcus serpens* type.

ANGUS MACNAB.

KNAPÉ (Finland). Pigmentation of the Retina from the Vitreous Chamber.

KNAPÉ investigated a myopic eye from an elderly man, in which detachment of the retina, eventually becoming total, had occurred. After some years changes set in of an iridocyclitic nature, and the eye was removed for the relief of pain. Pigmentary degeneration of the detached retina had been observed during life, until all view of the fundus became shut off by the inflammatory process.

From the microscopical examination of this eye, Knapé comes to the conclusion that "the cause of retinitis pigmentosa is two fold; a *predisposition* on the part of the choroidal vessels to endarteritis obliterans, due to a congenital anomaly, and an *excitant* in the form of some disease of the eye, a fever, or syphilis. The nature of the disease is a gradually progressive endarteritis obliterans, which begins in the smallest capillaries of the choroid behind the ciliary body. As a consequence of altered nutritive conditions, this process produces an atrophy of the retina, which slowly proceeds from the periphery toward the centre, together with a secondary migration of pigment into the retina." In expressing this opinion, he endorses the view more commonly held regarding the cause of pigmentary degeneration of the retina, which has been put forward by Wagenmann, Knickman, Hirsch and others, on the effects of interference with the choroidal circulation on the neuro- and

pigment-epithelium. The order, however, in which the various parts of the retina lose their functions does not support the statement that the smallest capillaries behind the ciliary body are first affected, or that the degenerative changes slowly proceed from the periphery towards the centre: this latter method is usually noticed in cases of primary atrophy of the optic nerve.

Whether Knapé is justified in forming his opinion from the case in point is another matter, since it is as well to bear in mind the possibility of some of the pigment found in the retina having originated from the ciliary body as a result of the inflammatory changes, though he considers that the difference between uveal and retinal pigment can be satisfactorily verified histologically.

MALCOLM L. HEPBURN.

MARTINDALE and WESTCOTT, *The Extra Pharmacopæia*. 13th edition, 1908. London: H. K. Lewis.

It is difficult to imagine what the world would be like without this stout little companion of the writing table. It is so complete, so handy, so up-to-date, so essential, it needs no praise. This edition is, of course, an enlargement of the previous one, for as the years go on new means of treatment cannot but arise and older ones be perfected, but the little book retains its old familiar form, and is not visibly stouter than it was. Few books justify their existence as the "*Extra Pharmacopæia*" does.

International Congress for the Amelioration of the Condition of the Blind.

WE are requested to draw the attention of our readers to the fact that an International Congress having for its object the discussion of means for the amelioration of the condition of the blind is to be held in Naples from 30th March to 3rd April, 1909, thus immediately preceding the Ophthalmological Congress in the same city. We learn from an official source that the subjects to be discussed will be as follows:—

What care, especially with regard to the senses, should be

bestowed on the blind during their infancy, in order that, in due time, their intellectual education may go on rapidly and resemble, as far as possible, that given to those who enjoy the blessing of sight.

What kind of teaching, within the limits of the elementary instruction that precedes the artistic and professional course of study, would tend more efficaciously to the development of the intelligence of young people who are blind? During this scholastic period, what would be the best occupations for them when out of school—and to what degree should they become part of the scholars' lives?

Are there any employments in which people who can see are employed, that, by dividing the work, the blind might be engaged in?

What should the education given to blind women in asylums aim at? Should it be to enable them to exercise a profession? To become workwomen? Useful members of families, helpers in household work? Useful elements in other asylums for the blind or not blind?

The action of the State regarding the education and the eventual social position of the blind.

Whether it be advisable in the treatment of patients afflicted with diseases immediately conducive to blindness, to give them, while their sight yet remains, such instruction as may be necessary to them when blindness overtakes them?

Any paper or communication must reach Naples not later than 30th December, and should be addressed to the Committee, Istituto Principe di Napoli, Piazza Dante, Naples. The Congress will be under the patronage of H.M. the King of Italy.

THE OPHTHALMOLOGICAL CONGRESS.

At the 11th International Congress of Ophthalmology there will be held, as on former occasions, an Exhibition of scientific apparatus, instruments and teaching appliances connected with Ophthalmology. The Committee therefore request medical men, as well as makers of optical, surgical and scientific apparatus, who are interested in the matter, to send in their exhibits not later than the end of November, 1908. Each exhibit should be accompanied by a paper giving its title and dimensions, with full working directions, and should be addressed to Prof. Arnaldo Angelucci, Naples.

Report of the Commission of 1906 to Investigate the Condition of the Blind in the State of New York. Albany, U.S.A. J. B. Lyon Co. 1907.

WE have received this voluminous report, a book of nearly 600 pages. It is partly occupied with statistics of course, but partly also with abundant information regarding the social and pecuniary position of the blind in various countries and in various parts of the State of New York in particular, and it contains a great number of illustrations of houses for the blind with some details of their scope and work, of occupations which can be and are conducted by blind persons. There are other and more painful illustrations also showing the appearances of children and other persons blinded by ophthalmia neonatorum, with the view no doubt of urging upon the public the ghastly fact that hundreds are yearly condemned to needless suffering and blindness for want of due care. The statistics, too, are calculated to drive this lesson home. We hope the publication may help in the hard work of endeavouring to remove this foul blot upon our civilisation. The book will prove of much value as a source of information to anyone working at the subject of care of the blind, as showing what can be done and is done in various places.

W. G. S.

THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED
KINGDOM.

Thursday, October 15th, 1908

The President, Mr MARCUS GUNN, in the chair.

CARD SPECIMENS.

A Spectroscopic Test of Colour Vision.—Dr. Maitland Ramsay.

The instrument shown by Dr. Ramsay is designed to test the colour sense by means of the pure spectral colours from a diffraction grating. It consists of a rectangular brass box $12\frac{1}{2}$ in. long, 3 in. broad, and $1\frac{1}{2}$ in. deep, mounted on a double metal support resting on a wooden base, and inclined at an angle convenient for ordinary vision.

An eyepiece at the upper end, magnifying about 10 times, has placed at its focus 2 diaphragms with slits which allow only one thin line of colour to be

visible in each. At the lower end light enters through 2 slits which are protected from dust by a slip of ground glass, the width of the slits being graduated by means of adjustment screws. In this way the brilliancy of the spectrum can be diminished or increased at will, the difference being measured by the numbers on the graduated screw heads, which indicate tenths of a millimetre in the size of the slits. The interior of the box is carefully blackened, and in the middle is placed a diffraction grating (containing 14,438 lines to the inch), on either side of which is a collimating lens.

The result of the passage of a ray of light through the lower slits, the grating, and the lenses, is that 2 spectra of considerable dispersion are found in the focus of the eyepiece, the one above the other. Either or both spectra may be moved from side to side by moving shutters controlled by screws, the degree of movement being shown on 2 dials at the lower part of the instrument, which are graduated in wave lengths, and also marked with the chief lines of the spectrum. The examiner having set a definite colour over one of the slits the patient is instructed to move the spectrum opposite the other slit by means of the screw until he finds the colour which he thinks corresponds to the one fixed as the test. The indices on the dials are watched in order to ascertain the degree of correctness of the matching.

At the upper end of the box is a rotatory diaphragm perforated by three circular apertures, any one of which can be turned into position in place of one of the slits. When seen through the eyepiece the diameters of the circles are equivalent to 1, 2, and 4 mm, respectively. This arrangement, which permits only a single circular spot of colour to be seen, enables the correct naming of the colours to be tested as well as the correct matching. If a double-image prism be adjusted over the eyepiece, this spot of colour is doubled, and by rotation of the prism, the second (or eccentric) colour spot can be made to revolve round the stationary one, like a satellite round a planet, and this arrangement forms a convenient test for a central colour scotoma.

The source of illumination is an electric lamp.

A case of Unilateral Ptosis, treated by the Mottais operation very slightly modified.—Mr. Sydney Stephenson.

A little girl, aged 2, was first seen on September 3rd, 1907, suffering from incomplete ptosis of the left eye. The movements of the eyeball were good, no synkinesis was noted, and there were no associated deformities.

On September 24th, 1907, the superior rectus was divided into 2 parts, an outer and an inner; the outer division was stitched to the upper lid

between the skin and the orbicularis muscle on the one hand and the tarsus on the other. The present appearance of the patient, 1 year after the operation, is entirely satisfactory; the lid is well raised, there is no squint, and the eye closes voluntarily, although it remains partially open during sleep.

Microscopical Sections from a case of Tubercular Iridocyclitis in a man aged 75 years.—Mr. A. Ogilvy.

This case was first seen in November 1906. The patient complained of severe pain in the left eye, radiating over the forehead and vertex; this condition had existed for 3 weeks, during which time the eye gradually became blind. On examination the anterior chamber was found full of greenish-yellow material like pus, and the iris was retracted.

The eye was enucleated, and the pathological examination undertaken by Dr. J. Walker Hall. The sections showed large collections of round cells embedded in fine connective tissue stroma, amongst which were many giant cells. Acid fast bacilli showing the characteristics of tubercle bacilli were also found.

Bilateral Traumatic Choroiditis.—Mr. J. B. Lawford.

This was a case of a man who had received slight injuries to both eyes; that in the left had been caused by a chestnut 3 years previously, and was followed by permanent defective sight. The blow in the right eye was caused by his thumb 2 months previously, and the vision immediately afterwards was found to be defective but has improved considerably since.

Ophthalmoscopic examination of the left eye showed cicatricial changes in the choroid and retina, limited to the macular region and the area between the optic disc and macula. In the right eye there was a recent hæmorrhage stretching horizontally outwards from the optic disc beyond the macula, accompanied by some pigmentary disturbance.

A drop of oil in the Anterior Chamber.—Mr. A. C. Hudson.

A man, aged 27, received an injury to the right eye from a rivet. A drop of castor oil was instilled immediately after the accident. On examination a horizontal wound of the cornea was found to which the iris was adherent. The application of a pad and bandage, together with the use of atropine, caused the iris to go back, and as soon as the anterior chamber was reformed oil drops could be seen at each extremity of the horizontal meridian. For 15 days they were fixed, but after that became movable, subsequently coalescing into one large drop at the upper part of the anterior chamber. There are at present, 4 months

after the injury, three drops, which are distinctly movable. The vision is good, the tension normal, and the eye quiet.

Peticular Keratitis.—Mr. A. C. Hudson.

Isabella M., 56, under the care of Mr. Morton at the Royal London Ophthalmic Hospital.

The grandmothers of the patient were sisters and the father and mother cousins, and their family consisted of 3 male and 8 female children, and no eye disease was found in any branch except that the mother, at 50, complained of a "spider's web over the left eye."

The patient had had good health, except for a slight hemiplegic attack, with some loss of sensation, in February 1900.

In July 1900, a peculiar form of striate keratitis was noticed in each eye, and the vision in the right was $\frac{6}{9}$, that of the left being $\frac{6}{6}$. There was a defect in the right upper quadrant of each field, and Dr. Taylor considered that there was a lesion either in the occipital lobe or posterior part of the internal capsule on the left side.

There had been gradually increasing failure of sight both for distant and near vision for the last 5 years.

The central region of each cornea is occupied by a mycelium-like striation, whose branches anastomose together, forming a fine network. The individual lines vary in thickness, and are set in different planes in the corneal tissue, but are on the whole nearer the anterior than the posterior surface. In addition to this there is, in the central area of the left cornea, exceedingly fine striation, which is also present in the right, though much less marked. The vision in both eyes at the present time is $\frac{6}{36}$, and the corneal sensation unaffected.

Case illustrating the treatment of Follicular Conjunctivitis by special method; one eye treated, the other untreated.—Mr. C. Wray.

In this case the left eye was merely treated by the application of Lotio Hydragryri Perchloridi 1 in 10,000; while the right was subjected to the special treatment. This consisted in crushing and massaging the follicles between the finger and the thumb, followed by the instillation of 20 per cent. argyrol and adrenalin 1 in 1,000. After a little over 3 weeks' treatment the right conjunctiva was cured, while the other remained unchanged.

PAPERS.

A case of Dipterous Larva in the Anterior Chamber.—Messrs. Frank G. Thomas and J. Herbert Parsons.

W. E., a boy aged 2 $\frac{3}{4}$, was first seen on March 18th, 1908.

There had been a history of some vague trouble in the left eye for several weeks, but it became definitely red and painful 3 weeks before

coming under observation. There was no history of injury, nor any discharge from the eyes or nostrils, neither had the child suffered from any illness. A thorough examination under an anæsthetic showed some slight ciliary injection, cornea perfectly clear, anterior chamber slightly deepened and the aqueous faintly turbid. The iris was discoloured and its texture indistinct; the pupil was irregular and partially occluded with brown lymph. Lying on the iris was a small, round, segmented "worm," the head near the angle of the anterior chamber in the lower and outer quadrant, the tail disappearing into the angle in the upper and inner quadrant. The body, curved between these two points, measured about 12 or 13 mm. in length and about 2 mm. in thickness. There appeared to be eight clearly defined segments, not quite so distinct towards the tail: and on magnification a delicate covering of connective tissue could be made out over the body and reflected on to the surface of the iris. No movements were observed.

The eye was enucleated, and microscopical sections were prepared by Mr. Coats, who described, in addition to the presence of the larva, signs of inflammatory exudation in the region of the iris, anterior chamber, and Schlemm's canal.

The sections containing the head of the larva were submitted to Dr. Shipley, of Cambridge, who pronounced it to be the maggot of either a Blow Fly or a *Sarcophaga Carnaria*. This occurrence of a Dipterous Larva in the human eye appears to be unique, whilst veterinary records contain only one case in which the larva of the *Hypoderma* was observed in and removed from the eye of a horse.

The mode of entry into the eye is purely conjectural. Both the Blow Fly and the *Sarcophagidæ* deposit their eggs, or living larvæ, in the nostrils and conjunctival sac, in purulent conditions. From these places the larvæ might work their way through the nasal duct into the lachrymal artery and thence by way of the central retinal or of a ciliary vessel into the eye. On the other hand, the more direct route from the conjunctival sac through the external tissues of the eyeball is a possibility.

Again the larva may have been an immature form of the *Hypoderma Lineator* of the ox, when its presence in the eye is more easily understood, since these larvæ normally exist in the subcutaneous connective tissue, whilst its recorded presence in the anterior chamber of a horse's eye proves its capability of entering that organ.

Dr. MACKAY mentioned a case which had come under his notice presenting similar appearances to the one described, and he hoped to have the opportunity of bringing it forward on some future occasion.

Major R. H. ELLIOTT spoke of the fairly frequent occurrence of "worms" in the eyes of horses in Madras and the crude methods used for their extraction. The parasites were usually very active, moving in the anterior chamber with great rapidity and sometimes passing into the posterior chamber. They could be easily removed by making a keratome incision and opening it by pressing on its lower lip when the larva was seen to approach its vicinity.

Six generations of Piebalds.—Mr. N. Bishop Harman.

Mr. Harman showed the genealogical tree of a family in which patches of depigmentation in various parts of the body had been transmitted from generation to generation for six generations; and entered into the question as to how far the facts in this case bore out the Mendelian theory of inheritance.

MALCOLM L. HEPBURN.

EPISCLERITIS PERIODICA FUGAX.

The Editor of the *Ophthalmic Review*.

Sir,

In a paper of mine on the above subject, published in the *Ophthalmic Review* in October, 1907, I gave the impression that there was not a correct description of the disease in Swanzy's Handbook, but I find now that in editions later than that which I possessed the defect is remedied. I hasten therefore to correct the impression I conveyed.

It is now nearly two years since the patient who provided the material for my notes had his last attack. I wrote to him some weeks ago enquiring how the residence in a more temperate climate suited his eye. His reply is as follows: "My eyes are quite right now. Last summer there was a slight tendency to go back on one or two occasions, but I took Quinine in pretty big doses, and it passed off in 24 hours."

I am, Yours etc.,

E. TEMPLE SMITH.

ENTOPTIC RESEARCHES INTO THE STRUCTURE OF THE VITREOUS.

By J. BURDON-COOPER, M.D., F.R.C.S.E.,
Surgeon to the Bath Eye Infirmary.

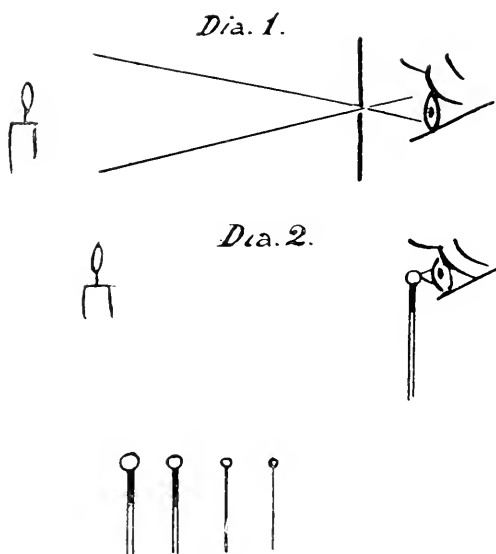
BEFORE entering into a description of the entoptic appearances which are the immediate subject of this communication, it may be well to say a few words upon entoptic vision generally and the special methods we have made use of for observing the interior of the eye.

Light entering the eye under certain conditions renders visible elements or structures within the eye itself: such vision is spoken of as "entoptic."

Under usual conditions of vision opacities in the transparent media are not observed, the reason being that the pupillary area on which the illumination of the retina depends acts as a broad, evenly-illuminated surface, being traversed by rays from all visible points, and under such conditions, only large objects, or such as lie close to the retina, cast visible shadows thereon. It is owing to this fact, that the pupil is not a mere point or focus of divergence, and that under ordinary conditions rays traversing it tend to a focus upon the retina, that we are saved the annoyance of seeing, in addition to external objects in the world around us, the interior structure of the eye itself.

Practically, for the purpose we have in view, we attempt to reverse the conditions cited above, and make use of a light of small dimensions situate as close to the eye as possible, so that rays emanating from it may enter the eye in a state of divergence and have no disposition to return to a focus on the retina. We may use either convergent or divergent pencils, but the latter are certainly the easier to work with. One of the commonest methods of obtaining divergent pencils of rays consists in focussing a candle

flame, or other source of light, upon a screen, with a single perforation, held close to the eye. From the opening in the card emerges a broad cone of diverging rays, and an eye placed close to the opening perceives a large, equally-illuminated, circular background—"Entoptic field of vision"—on which are projected shadows of elements within the eye. Only the divergent pencil is available in this case, the convergent one lying in front of the puncture. (See diagram 1.)



The light reflected from the sky, a white bank of cloud or an illuminated white disc and admitted into the eye through a fine puncture in a thick black card, a highly polished metallic knob, the head of a pin, the surface of a convex lens, the image of a distant flame formed at the focus of a lens of short focus, convex or concave, the highest objective of a microscope—may all be utilised and

provide efficient divergent pencils of rays. The choice of the method depends on the position of the structure under examination in the eye. The apparatus used by us, and with which most of the diagrams were drawn, consisted of a spectacle lens which, owing to a fall, had become chipped at the margin. The chipped portion constituted a highly concave lens of small diameter, and formed an admirable entoptoscope.

Quite recently, while experimenting with the microscope, we found that by a simple modification and changing of lenses, the instrument possesses all the qualifications of a perfect entoptoscope. All that is necessary for the conversion of the microscope into an entoptoscope is to remove the high power objective from the nose piece and place it upside down on the top of the eye piece; a lower power is used as the objective. By means of the mirror below the stage a beam of light is thrown up through the condenser and objective, and an eye placed close to the inverted objective at the eye piece sees with great distinctness the different shadows familiar to those who have studied the eye in this way.

By this method the amount of light which enters the eye is absolutely at our command, since by stopping down the coarse and iris diaphragm we can vary at will the luminosity of the entoptic field. This is important, as objects situated in the anterior part of the vitreous, which are very indistinctly seen when the field is bright, stand out in great relief when the illumination is diminished. A position of condenser and iris diaphragm may be found which gives the maximum distinctness of any object under examination. Objects near the retina are best seen under good illumination, those situated in the anterior part of the eye best with feeble illumination, while for objects between these two extremes a progressively diminishing illumination is necessary. For accurate observation it is best to have a small, bright, circular source of light: an

Argand burner with asbestos chimney and iris diaphragm answers well. Greater distinction of the shadows can often be obtained, even after the various adjustments of the microscope have been made, by placing a perforated vulcanite disc on the stage immediately above the condenser, and a stenopæic slit will be found useful used in the same way. The finest adjustments are made by placing the different smoked and coloured glasses usually found in trial cases over the vulcanite disc. The greatest contrast between the shadow and the field is thus obtained.

Another extremely simple and effective method consists in making use of a small glass sphere, from 1 to 2 m.m. in diameter, held close to the eye. This constitutes a lens of exceedingly short focus, and with a good source of light gives an excellent divergent pencil. The little device is easily made, by fusing one end of a fine capillary tube (made by drawing out a piece of ordinary glass tubing in the flame of a spirit lamp) until a small bead forms. We can increase the size of the bead at pleasure, by fusing more and more of the capillary tube, and the larger the bead the greater the illumination of the entoptic field. (Diagram 2.) In making the little instrument it is best to have a small gas flame and hold the tube vertically in it so as to ensure the bead being as nearly spherical as possible. When it has cooled it is held in an ordinary match flame so as to blacken it, the head alone is then polished by turning it round between the finger and thumb. The blackening prevents the annoying streak of light formed by the cylindrical portion near its junction with the head. By having beads of different sizes we secure different intensities of illumination: the smallest bead being used for the investigation of structures in the anterior part of the eye, and the largest for those nearer the retina. Of all the methods that we have described this little bead entoptoscope is the most handy and useful. The method of using the entoptoscope is as follows:—The

head is held close to the eye between the latter and a distant source of light. (Diagram 2.) The eye perceives a large equally illuminated circular field—the retinal image of the pupil,—and on it are projected, with more or less distinctness, the shadows of objects within the eye itself. At the first introduction to the interior of the eye in this way the apparently infinite number and variety of the shadows that may be seen is nothing short of bewildering, but after a little experience in the use of the entoptoscope we soon begin to distinguish between the different appearances and are able to group those which are similar, irrespective of size. By an examination of the movements of the shadows and their behaviour when the eye or the source of light is moved, and by a determination of their size and position in the eye (a problem which it is hardly necessary to enter into here) we can relegate each to its approximate position in the eye, and so arrive at the cause of the appearance and the nature of the shadow-giving body. Thus, for instance, the appearances which are shewn in figure 1 were found to have their origin in the film of tears existing on the cornea. On looking up quite a shower of bright little spherical bodies will fall in the entoptic field: these are droplets of meibomian secretion existing in the tear-film on the cornea—an indication of the film itself is given in the upper part of the figure, it has the appearance of a fine mosaic. Sometimes the droplets adhere together in small groups or short strings. In the figure five droplets are seen adhering together along a fine hair. The laminated appearance at the lower part of the figure is the entoptic shadow cast by the wedge-shaped collection of fluid immediately contiguous to the lid margin. The movable, isolated, spherical bodies, described by writers on entoptics as occurring in the vitreous, are in all probability to be attributed to these meibomian droplets on the cornea. We can easily ascertain that this is so by raising the upper lid, when the

appearances due to the film and the shower of droplets disappear at once: the explanation being that the film containing the fatty matter is moved over the cornea by the lids. Muscæ arising from this cause, portions of mucus, droplets of fatty secretion, moisture and foreign bodies on the cornea, can easily be diagnosed by restricting the movements of the lids.

Figs. 7 and 8 represent strings of pearls described by Helmholtz as in the vitreous. They are situated close to the retina and move in the same direction as the eye, indicating that they are situated on the retinal side of the rotation centre. Fig. 8 shows that the strings vary in size because situated at different distances from the retina, the smallest being nearest and the largest furthest removed. The appearances seen in Figs. 7 and 8 are best seen with a good illumination. On examining the strings seen in Fig. 7, it will be noticed that some beads stand out more distinctly than others. This is due to the fact that at this point there are really two beads, one being entirely covered by the other, causing the combined shadow to be denser and thicker and the refracting centre brighter than in the case of a single bead. Occasionally a tri-lobed appearance is observed, evidently due to a similar overlapping of three beads. Probably another string of beads is attached at the points in the string where one or more beads are darker and thicker in outline than others. Fig. 7 indicates such an attachment: the beads of the portion *a* of the string are smaller than those of the part *b*, because situated in a plane nearer the retina. The fine mosaic appearance, *c, c*, shown in Figs. 7 and 8 is, we believe, similar to that on the cornea, and is to be attributed to a thin layer of fluid existing between the retina and the hyaloid membrane.

Whereas the strings of beads in the vitreous are fixed, that is, they present no visible movement apart from that occasioned by the movement of the eye, we have observed

a movement of the elements in this mosaic even when the eye is kept still. This entoptic appearance argues for a lymph space existing between the retina and the hyaloid membrane. Space forbids going further into the details of Figs. 1, 7 and 8.

The entoptic appearances which I have suggested as being due to folds of the hyaloid membrane are represented in Figs. 2 to 5 and 11 and 12. They are perhaps the most conspicuous of all entoptically perceived shadows, and were the first details of the interior structure of our own eye we were introduced to, more than three years ago now. We took them to be vessels at first, but a little consideration and observation of them convinced us of the fallacy of this, as they possessed a certain limited range of mobility, independent of the movements of the eye, though occasioned by them. The appearances, as the diagrams show, are those of two dark lines bordering a lighter band. The distinctness of these dark lines varies occasionally with the character and size of the source of light, and, especially if the source of light be small, the lighter centre may be bordered by two or more dark lines. These supernumerary lines are diffraction fringes.

Diffraction fringes may be seen surrounding almost every entoptic appearance if the light source be sufficiently small. The outer margin of the dark lines is more distinct and shades off more abruptly than the inner margin, which gradually merges into the lighter central part of the shadow. This detail is an important one as indicating that the shadow is not cast by a solid filament as has been supposed, but by a fold, for if we look at Fig. 10, which is the shadow of a pin upon a screen, the pin and screen being at a definite distance from a broad source of light, it will be seen that though a solid body or filament may cast a shadow which has a tubular appearance yet the edges bordering on the lumen are sharper than the outer

ones, just the reverse of what we find in the shadows of the structures under examination. The diameter of the shadow of the fold is the same throughout its entire extent, except when it becomes folded on itself antero-posteriorly, so that one portion of it lies nearer the retina than another, and at its extremities, where it becomes pointed, as indicated in Fig. 6. The irregularities are, however, so slight that they are only noticeable with difficulty. The length of the folds greatly exceeds their breadth, and in the main their disposition is vertical when the eye is at rest. In no case have we been able to observe any branching, such as might be expected with a filament. The folds may cross one another as indicated in the diagrams, but they never unite. The movements of the shadows of the folds show that they are connected in some way with the vitreous. When the eye is directed upwards suddenly and then brought back into its straight forward position, the shadows are seen to move downwards and then return to their former position, showing that they are in connection with a part of the eye which has a limited mobility independent of the eye movements, but initially caused by them. Such is what we should expect in so highly elastic a structure as the vitreous. The lateral movement of the shadows is more extensive than the vertical. When the eye is at rest the shadows have a more or less vertical direction and are less numerous than when the eye is turned either laterally or vertically up and down. In the latter positions the shadows are multiplied considerably (fig. 3). The direction of the shadows is influenced by the particular movement of the eye, and by the unequal density of the vitreous. If the eye is moved up or down they have a more or less horizontal direction, and if laterally they assume a vertical disposition. That the appearances are due to folding of a membrane must be evident to any who have seen them, as the folds which are produced by movement of the eye can be seen to become smoothed

out and finally to disappear when the eye is brought to rest. We have observed this repeatedly, and it is not due to the shadow passing out of focus, as the breadth of the lines does not alter: the shadow gradually disappears as its cause—viz., the fold—becomes non-existent.

Our measurement of the shadows shows the object producing them to be from $\cdot 15$ to $\cdot 2$ m.m. in diameter, and to be situate approximately $15\cdot 9$ m.m. from the retina. From these measurements and from the behaviour of the shadows we can only conclude that they are produced by folding or wrinkling of that part of the hyaloid membrane



Fig. 13.

situate immediately behind the lens. There is ample proof entoptically, if this were needed, to show that the hyaloid membrane extends behind the lens and does not stop short at its periphery as was formerly taught. Those who have examined the vitreous microscopically cannot but have been struck by the extreme delicacy of the hyaloid membrane and the tendency it has, on the slightest provocation, to become folded. Fig. 13 is a photograph showing the folding of the hyaloid membrane in the sheep's

vitreous. The folds were produced by merely touching the membrane with the point of a needle as it lay on the vitreous proper. The mark \times denotes the position of the needle, and at this point the mere depression of the membrane caused it to become thrown into folds which are seen converging towards the position of the needle point. The close resemblance of these folds to fibres is apparent.

We have been studying the vitreous now for some years, both entoptoscopically and microscopically, and we cannot say that we have found any evidence of filaments or adhesions in a vitreous which has not been altered by chemical agents or even water. The appearance of fibres radiating from the ciliary region in the vitreous of the ox is due to folds of membrane and not to fibres.

Before going on to describe the appearance seen in figure 4, it may be well to explain how the folding of the hyaloid membrane gives rise to the tubular shadows we have described. The ease with which the hyaloid membrane is thrown into folds has already been referred to, as also the fact that movement of the eye gives rise to an increase in the number of the folds, and that these additional folds become smoothed out when the eye is kept still, a certain number, however, always remaining. Now, in the case of the eye, we have a highly elastic body, the vitreous, contained in a firm fibrous envelope. When the whole is moved the tendency is for the contained body, owing to its inertia, to lag behind the movements of the container, and in so doing it becomes subject to torsional strains, which are greatest furthest from the centre of movement. This strain is borne by the hyaloid membrane, and as such strains must be unequally distributed, owing chiefly to the varying density of the vitreous, the membrane becomes folded. Other factors undoubtedly are at work, but the explanation we have given seems to us to include the most important, and the cause is to be sought in all probability along this line.

The folds produced by unequal dragging on the hyaloid membrane give rise to an indentation of the surface of the vitreous, so that it becomes corrugated, and it is these corrugations which, acting optically as cylinders, produce the tubular-shaped shadows, in the same way as a piece of clear corrugated glass produces them. An illustration is to be found in the phenomenon known as the "tears of strong wine." We know that these are produced by the water and spirit creeping up the side of the glass; the spirit evaporates and leaves the water, which runs down the sides of the glass in little streams. These are in reality transparent cylinders, and the shadows of them cast upon a white tablecloth by a broad source of light consist of two dark bands separated by a lighter centre in every respect similar to those observed in the eye.

That the appearances which we have drawn and figured in 2 to 5 and 11 and 12 are produced by a folding of the hyaloid membrane and consequent indentation of the highly elastic and easily compressible vitreous we fully believe. It is generally conceded that the density of the vitreous differs in its different parts, being greatest in its lowest and least in its upper portions. Owing to this difference in density there is an unequal dragging on the hyaloid membrane, with the result that it is always, even when the eye is quiescent, in a folded state. Some folding is always to be seen entoptically, and this we believe is the explanation of it.

Figure 4 is perhaps the most interesting of all the diagrams; it shows very clearly the folds terminating by an irregular sinuous edge around what is evidently an opening. This is the jagged edge spoken of by Helmholtz (*Physiologischen Optik*). "If one dilates the pupil and brings the illuminating point close to the eye so that one can see only a little to the side of the line of sight, one perceives by suddenly interrupted strong lateral movements of the eye still more skin come into view below the

lens, which seldom reaches the line of sight and ends here by an irregular jagged edge." This opening, bounded by the irregular edge caused by the folds, is, we take it, the anterior opening of the hyaloid canal, and the irregular edge is caused by the puckering up and folding of the hyaloid membrane as it passes into it.

We are not aware that any description or drawing of this has been given before. Helmholtz described the edge, but offered no explanation of it, nor did he give any drawing of it. By lying fully supine, with the light immediately above, we have succeeded in seeing the whole circumference of this opening. Its shape varies with the movement of the eye. In our right eye the opening is roughly triangular with the apex of the triangle above. Figures 4 and 12 show the opening in part: it is almost an impossibility to draw it completely. It would seem, from an entoptic examination of this opening, that it remains patent at its anterior end, and that the hyaloid canal is not a pouch ending blindly near the lens, as is at present supposed.

In figures 11 and 12, *a* and *b*, the folds are seen terminating around another edge. This edge is situated not far from the retina, and is on the retinal side of the rotation centre of the eye. It will be seen that whereas the edge figured in 4 forms a large part of a small circle, that indicated in figures 11 and 12 is a small portion of what is evidently a large opening. We have been able to see a great deal more of the circumference of this opening than is drawn in the figures, and our supposition is that it is the posterior opening of the hyaloid canal or a folding of the lining of this canal very near the retina.

If we are correct in this the hyaloid canal, instead of being a canal of more or less uniform diameter from before backwards, widens considerably from the lens to the retina, so that it is roughly conical with the apex at the lens and the base near the retina. But it is beyond our

present purpose to enter upon the special configuration and function of the vitreous, which we have arrived at as a result of our entoptic studies. This we may be able to do at a future date.

Before concluding we should like to add a word or two upon the historical part of our subject.

The history of entoptics in connection with the vitreous proper is a long and interesting one, and has associated with it many well-known and honoured names, among which may be mentioned Brewster, Listing, Donders, Mackenzie, Doncan and Helmholtz—the founders of modern physiological optics. Many other careful and conscientious writers took pains to scrutinise the vitreous entoptically. Few, however, as far as we can ascertain, saw the appearances we have described, or, if so, have left little record of them. One of the greatest difficulties we have to contend with is to know exactly what the observer saw, as in the greater number of cases no diagrams whatever are given, and it is almost impossible from the descriptions to form any conception of the appearances seen. It was Doncan and Helmholtz who first observed the appearances we have described and attributed them to folds of membrane existing in the vitreous, and Helmholtz's conclusion was that they were the indications of the remnants of a fœtal cellular structure, some tags of which still held to the hyaloid. This description, as well as his conclusions, have been most severely criticised. Jago, whose book was published in 1864, says of Helmholtz's observation:—"It is certainly curious that a man so accomplished in physiological optics as Helmholtz, should carelessly admit the possibility of seeing folds of membranes in the vitreous in the shape of bright ribbons bordered by a couple of darker, not sharply defined lines"—a description which is not only accurate without doubt as to the character of these entoptic appearances but also as to their origin. That Jago never really saw them is evident not only from his criticism of

Helmholtz but also from a perusal of his work—although personally we do not agree in every detail with Doncan's and Helmholtz's description of the appearances and particularly with the latter's diagram (Fig. 96, p. 190, *Physiol. Optik*). That Helmholtz had acquainted himself with them is evident, and to him must be due the credit of suggesting the mode of origin.

The most recent writer on this subject is Fortin, who, in an article published in the *Comptes Rendus des Séances de la Société de Biologie* of February 1907, alludes to the inaccuracies in Helmholtz's description and diagrams, and describes the appearances accurately, though still alluding to them as filaments, as others have done before him, without offering any explanation of the appearances. We might add that our diagrams were drawn two years at least before we were at all aware of Fortin's paper.

Finally, we should say that we are highly conscious of the shortcomings of our communication on this subject, but if it should help in any way to clear up the confusion existing on one group of entoptic appearances by relegating them to what is undoubtedly their cause our work will not have been in vain.

DESCRIPTION OF THE PLATES.

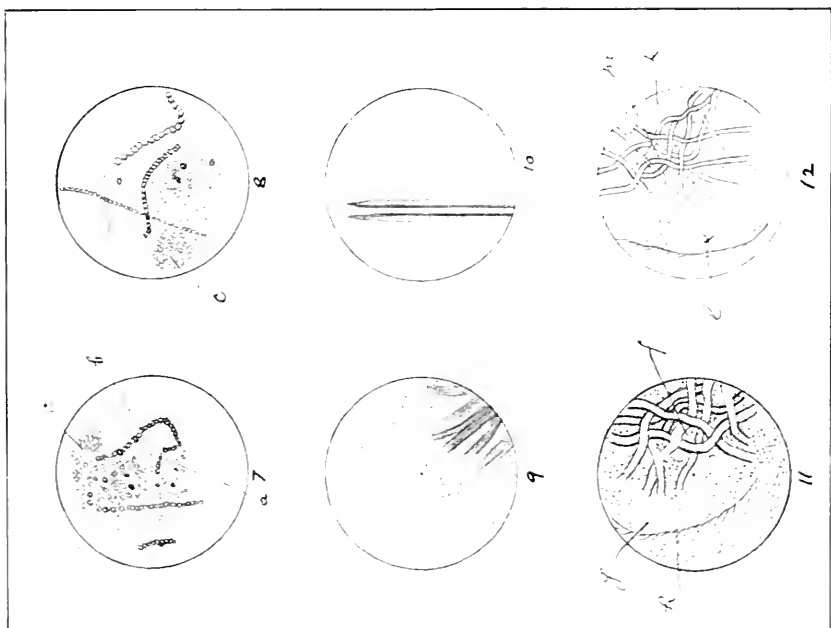
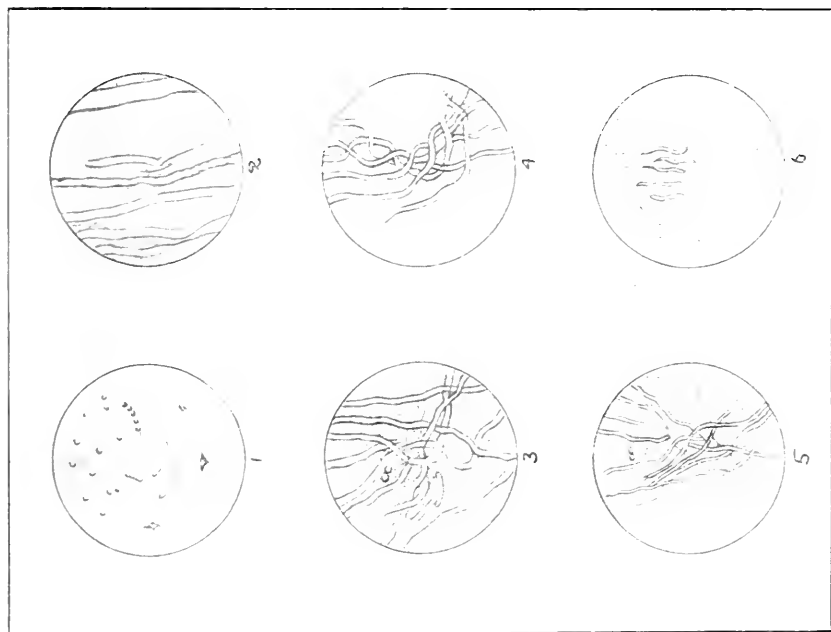
Fig. 1. Showing droplets of meibomian secretion on the cornea. The fine mosaic appearance seen in upper part of figure is the entoptic indication of the film itself. The laminated appearance below is due to the wedge-shaped collection of fluid along the lid margin.

Fig. 2. Folds of hyaloid membrane seen with eye still. The large one to the right of the figure was proved, by moving the source of light to the left, to be really two folds close together; a faint indication of this is given.

Fig. 3. Folds, increased in number with movement of eye—their disposition not solely vertical.

Fig. 4. Folds surrounding the anterior opening of hyaloid canal.

Figs. 5 and 6. Folds of membrane. Fig. 5 ought to have been drawn to same scale as that of Figures 2, 3 and 4. Fig. 6, probably an acute bend in a fold near middle of vitreous. Note pointed extremities.



leakage from the joints or regurgitation. This sounds rather a bold statement, but it is quite true. The perfection of the compression of the syringe depends upon the narrow circular groove in the solid metal plunger. The groove holds a cushion of air, which makes a perfect packing, and prevents regurgitation, but allows of perfect freedom of motion by the piston. (Some of the syringes sent out have a wire ring set in this groove to prevent the piston working too easily, but for ophthalmic purposes it is best to remove the wire.)

The barrel of the syringe is of glass, and the mounts are secured to it by a metal packing, which allows of boiling without fear of loosening them.

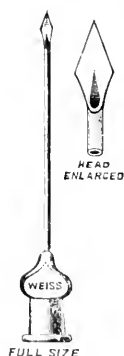
There are two nozzles: one long and slender, the other short and stout. The mounts have winged butts which greatly facilitate the fixing and detachment of the nozzles.

The collar which holds in the piston has a bayonet lock, and the projecting rim of the collar is wide enough to give a good grip to the fingers. This rim has two "flats" on it so that the syringe cannot roll off the table.

To secure the best results the syringe should be washed after use by drawing water, and then alcohol, through it: then the piston should be detached and placed in the separate clips fixed in the case for its reception

N. BISHOP HARMAN.

THE BACTERIOLOGICAL EXAMINATION OF THE AQUEOUS HUMOUR.



It is frequently desirable to examine the contents of the anterior chamber bacteriologically. Up till now it has been

a matter of difficulty to secure a sufficient quantity of aqueous, and to ensure the absence of contaminating conjunctival organisms from the fluid collected. Previous methods have depended upon catching with pipettes or scoops what fluid gushed from the anterior chamber after it had been perforated with a needle. Such methods were both wasteful and unreliable; most of the fluid that escaped from the chamber was lost, and what was caught had been in contact with the conjunctiva, so its purity was questionable.

The figure shows a hollow spear-headed needle which I have had made by Messrs. Weiss, and which enables the aqueous to be withdrawn directly from the anterior chamber with ease and reliability. I have used it myself, and several of my colleagues have used it, with complete success. The needle has a sharp cutting spear-head point, and the shaft is bored through just like any hypodermic needle. It is mounted on one of the winged butts that fit on to the lachrymal syringe that I have described on the preceding page.

When it is desired to extract the aqueous, the conjunctiva should be well irrigated with normal saline solution, then the excess of fluid should be removed with sterile filter-paper. At this point it is well to take a control culture from the conjunctiva. When absolute freedom from conjunctival contamination is desired, the site at which it is proposed to enter the needle should be cauterised lightly with the actual, or galvanocautery; and the needle should be passed through the cauterised area into the chamber.

The syringe serves as the handle of the needle: it should be boiled, and after that should lie in sterile normal saline solution until the moment of use. The operator inserts the needle into the chamber just as one would a Bowman's needle, and then while he steadies the syringe an assistant gently draws back the piston until the cornea flattens. The eye of the needle must look toward the cornea so that iris tissue be not sucked into it.

In some cases it seems undesirable to leave an empty anterior chamber, then the anterior chamber should be entered from beneath the conjunctiva so as to provide a long valvular covering, and after the extraction of the aqueous, the syringe can be charged with sterile normal saline solution, the needle reinserted into the chamber, and saline solution injected.

As regards the care of the needle when not in use: I find

that it is best to keep it within its metal sheath in a bottle of absolute alcohol, this secures it from rusting and keeps the interior of the tube sterile. The cost of the needle is only a few shillings.

N. BISHOP HARMAN.

REVIEWS.

S. CALDERARO (Palermo). Transplantation of the Cornea.

La Clinica Oculistica, September, 1908.

A YEAR or so ago Dr. Speciale-Cirincione succeeded in obtaining a good result, or what under the circumstances we may fairly regard as such, in a case in which the corneæ were rendered opaque by a burn (see "Ophthalmic Review"); these he removed, replacing them with healthy corneæ taken from another patient. Plange also, in the *Klinische Monatsblätter* of March last, published a case in which he obtained vision equal to counting figures at 4 M. The cases have been so very few in which any success at all has been obtained that it is well worth while to recall these and to record also the attempt of Calderaro in a unique case, of which we shall proceed to give some details.

The patient in this instance was a lady of 66 who had a small circumscribed tumour, most probably malignant in character, affecting the left cornea. Twenty-four years previously she had had a fall, wounding the left lower eyelid and the bridge of the nose, with resulting ectropion and scarring. In February last she noticed painless vascularisation of the inner angle of the left eye, especially at the lower inner side of the cornea. Rapidly a small yellowish mass grew forwards from this portion of the cornea; this caused perhaps a slight feeling of itchiness though not of pain, and gave rise to a little annoyance from mechanical interference with the closure of the eyelids. The remaining portions of the cornea continued to be perfectly normal in transparency. Calderaro decided to remove the tumour and at the same time to attempt to transplant a portion of cornea from another eye: for this purpose he would of course have preferred to have obtained the graft from a child's eye, but such not being to be got at the time he had to be content with the cornea from an eye with absolute glaucoma in a woman of 52 who had sought relief from incessant and violent pain: in her case there was no hope of relief by any means short of enucleation. Both women having been prepared for operation on a certain day, the surgeon first removed with a 6 mm. trephine the whole thickness of cornea

(with the tumour included) down to Descemet's membrane; the isolated piece of cornea being cut free, its place was supplied by a disc removed from the glaucomatous cornea. For fifteen minutes this was held in position by gentle finger pressure, a procedure to which the author attributes much of the success he attained, for he believes that in this way the new graft became at once adherent to the spot, without the delay which would have been otherwise entailed. Xeroform was dusted over cornea and lids, which were very cautiously placed in position and a double bandage applied.

When he examined the eye on the third day he found the graft healthy looking, in good position, and transparent: there was a very thin layer of blood underlying the graft at its inner side. Though the graft was just to a very slight degree elevated above the surrounding cornea, yet Czapski's corneal microscope showed the general epithelium of the cornea continuous with that of the graft, the edge of which showed somewhat whitish. The anterior chamber was of normal depth: there were no synechiae, the pupil was circular, of moderate size, and reacting freely: as yet the graft was insensitive. A simple bandage was then applied and changed daily, a weak solution of tannic acid and glycerine being dropped in. After ten days a slight degree of opacity was present in the graft, to which a rather large bundle of vessels advanced from the corneo-scleral margin, but transparency returned in a week, and as the thin layer of blood beneath the graft had by that time been absorbed, even the structure of the iris was fairly plainly visible. A month after operation the patient had $\frac{1}{20}$ vision, and the graft was quite as transparent as the rest of the cornea: the fundus could be imperfectly made out with the ophthalmoscope. Sensation was by that time beginning to appear in the graft. After three months the graft was as transparent as the rest of the clear cornea, from which indeed it could only be distinguished by the fine white line surrounding it; by this time, too, the astigmatism, which had at first been very marked, as shown by Placido's disc, had greatly lessened in amount.

Having thus described the highly gratifying result of his surgical interference, Calderaro adds a few general considerations regarding corneal grafting: he is convinced that if we are to have success in the sense that the graft not merely lives but remains transparent we must have in the eye a healthy

cornea, healthy especially in its deeper layers, and an intact Descemet's membrane. The graft can live and remain transparent only if lymph reaches it in abundance from the base and from the surrounding cut surface, and if any inflammatory change in the cornea has destroyed or interferes with the normal state of that structure, the graft cannot fail to become opaque,—supposing that it lives at all. It was because these conditions were fulfilled that the upshot was so favourable in this case, for except for the growth springing from the superficial layers only, the cornea, especially at the base of the flap, was sound and healthy. He believes further that the graft must be laid down upon Descemet's membrane itself, not upon layers of remaining cornea, in order that the lymph may come into immediate relation with it. A third important condition of success is that the corneal graft should be taken from a human eye and that the donor should be as young as possible. The graft ought to include the whole thickness of the cornea, as this not only avoids œdematous swelling of it, but retains as far as possible the apparatus of the normal osmosis. So far as regards the actual instruments and mode of performance of the operation, Calderaro believes the corneal trephine to be the proper instrument to employ rather than the knife, as by the use of it—among other advantages—one secures that the graft is precisely adapted to the prepared area. He did not find it necessary, nor did he think it advisable, to fix the graft in place by crossed threads as Speciale-Cirincione advised, for the pressure of the threads threatens the integrity of the graft.

Calderaro and his patient are greatly to be congratulated upon the success of this skilful venture; the more we know of the elements of success and the causes of failure in transplantation of cornea, the nearer we may attain to a reasonable hope of help for many an unfortunate sufferer from dense opacity of the cornea.

W. G. S.

ZUR NEDDEN (Bonn). **Opsonins in the Eye.** *Zeitschrift für Augenheilkunde*, April, 1908.

WRIGHT's opsonic theory was at first received in Germany with almost universal opposition, but more recently several investigators have confirmed his results and shewn their practical value.

Zur Nedden's investigations were made in order to deter-

mine whether the opsonic substances found in the blood of non-immunized human beings and animals pass into the conjunctival secretions and into the non-vascular parts of the eye (cornea, aqueous, vitreous and lens) and, if so, under what conditions they do so.

He gives in detail the technique of his experiments, but for this the original must be consulted. Various kinds of bacteria were used but preference was given to those which are ætiologically active in diseases of the eye, *e.g.*, the Morax-Axenfeld diplobacillus, the staphylococcus albus, the streptococcus, and the pneumococcus. The dysentery bacillus was also used because it is easily phagocytised.

The results obtained are highly instructive and are classified as follows:—

I. *Opsonins of the Conjunctiva.*

Thin blenorrheal secretion has a phagocytic action on diplobacilli and on dysentery bacilli. The more profuse the discharge the more powerful is the opsonic effect, but if the secretion has become somewhat thickened, the phagocytosis is hardly observable. Heating the secretion for half an hour to 58° C. destroys its opsonic power. The secretions from conjunctivitis caused by diplobacilli, pneumococci, and Koch-Weeks bacilli have no phagocytic power. This may be due in part to the scantiness of the secretion or the mildness of the inflammatory reaction as in diplobacillary conjunctivitis, or it may be due to the large amount of bacteria in the secretions as in Koch-Weeks conjunctivitis, the opsonin disappearing because it combines with the bacteria. The toxins of all forms of conjunctival bacteria soon exhaust the phagocytic power of the leucocyte. The secretions caused by streptococci and staphylococci also have a slight phagocytic action.

In all cases the leucocytes need the co-action of the liquid serous constituents of the secretion and no phagocytosis takes place if the latter is replaced by physiological salt solution.

Tears and normal conjunctival secretion exhibit no opsonic power and the leucocytes in pus from the tear sac can not be induced to take up bacteria.

This is to be explained by the fact that the secretions of the tear sac contain much mucus and lacrimal fluid, both of which contain no opsonins. In acute dacryocystitis the opsonic power is probably destroyed by the excessive number of bac-

teria. The leucocytes contained in the stagnant secretion of the sac are probably too old and degenerated to perform phagocytosis even though they have not been damaged by microorganisms.

II. *Opsonins in the Aqueous Humour.*

The first aqueous obtained by tapping the anterior chamber has no phagocytic power whatever. But when the tapping is repeated a few minutes later when the chamber has refilled, the aqueous has a marked phagocytic power. The longer the delay between the consecutive tapplings of the aqueous the weaker is the opsonic effect, so that four to six hours following the first puncture the second aqueous shows no opsonic action. Frequently repeated puncture of the anterior chamber gives aqueous which is no more powerful opsonically than that obtained at the first puncture. Puncture of the vitreous also increases the phagocytic power of the aqueous humour. It increases in proportion as the punctures are repeated, but the opsonic substances again disappear after a few hours.

Opsonins pass into the aqueous humour as the result of inflammatory irritation and increase in quantity with the intensity of the inflammation.

Subconjunctival injection of concentrated salt solution (1 c.c. of 10% solution) yields decidedly less opsonins in the aqueous than inflammatory irritation and tapping of the anterior chamber. A subconjunctival injection of physiological salt solution causes no increase of the opsonic power of the aqueous, but it may do so when injected into the corneal lamellæ, where it would cause a more extensive tissue lesion and more irritation.

The opsonic power of the aqueous remains entirely unaffected by hyperæmia, whether induced by direct cutting of the eye or by application of a compress round the neck. The opsonins of the aqueous, like those of the conjunctival secretions, are destroyed by heating to 58° C. for half an hour. Zur Nedden's investigations on the opsonic power of the *human* aqueous are highly instructive and of great practical importance.

Aqueous humour was obtained by Samisch's section from a case of *ulcus serpens*. The rapidly congealing fluid showed a high opsonic power for dysentery bacilli, staphylococci, pneumococci, streptococci and diplobacilli, although somewhat below that of the normal blood serum of the same individual. The

aqueous obtained by reopening the puncture on the following day was somewhat less active, and when on the fourth day the aqueous was again withdrawn its phagocytic action was scarcely stronger than that of a physiological salt solution. This phenomenon is to be explained by the fact that the progress of the ulcer had been arrested and the pneumococci had disappeared on the day following the puncture, and on the fourth day the irritability of the eye had materially decreased. On this shewing the opsonic content of the aqueous of the human eye directly depends upon the intensity of the inflammation—the more violent the reaction the more abundant the opsonins in the aqueous. The coagulability of the aqueous is an unmistakable sign of its containing the opsonins of the normal blood serum, and the persistence of coagulating power in the aqueous is a sure indication that the ulcerative process has not abated, and it is only when the escaping aqueous refuses to coagulate that the danger has subsided and the necessity for reopening the incision no longer remains.

III. *The Opsonins of the Vitreous Body.*

The vitreous of the normal eye of rabbit and man has no opsonins for the bacteria mentioned, neither are any produced by repeated paracentesis of the cornea, subconjunctival injections of concentrated salt solution, or induced hyperæmia. Repeated puncture of the vitreous itself induces a slight opsonic power in the vitreous after two or more days. This action, which is slow to appear, is also slow to disappear, *i.e.*, it remains for several days. When the vitreous body becomes inflamed opsonins appear in it provided the inflammation is not of an intensely purulent character, nor overloaded with bacteria. In the latter case not only is there a scarcity of opsonins but the pus corpuscles themselves have lost their phagocytic power. Such a result was found in inflammation set up by injection of staphylococcus culture into the vitreous of a rabbit's eye, and in a case of pneumococcal panophthalmitis in a human eye.

IV. *The Opsonins of the Cornea.*

After repeated paracentesis of *ulcus serpens* in the human eye the scrapings from the resisting margins of the corneal ulcer showed pronounced phagocytic power. This may be due to the passage of the active substance from albuminous and

opsonic aqueous humour into the inflamed and incised corneal structure, or, more probably, by an invasion of opsonic substances from the capillary loops of the corneo-scleral junction into the corneal parenchyma. It would appear that as a rule the quantity of opsonins is too small to reach the infected focus in time and effectually, and it is only after incision of the ulcer that they are carried over into the cornea from the hyperæmic vessels in its vicinity. The highly virulent pneumococci being protected by their capsules are not susceptible to phagocytic action, and it is only after their virulence has suffered from the bactericidal substances of the blood that the opsonins of the normal serum can act effectively on the pneumococcal ulcer.

In some cases there is neither a bactericidal nor an opsonic action noticeable after keratotomy, because the general organism, on account of recent illness or other causes, does not contain these substances in sufficient quantity. Such cases are very rare, and if the punctured cornea be opened frequently—even twenty times consecutively—at intervals of half to one day “then the scanty opsonic and bactericidal substances of the reduced organism will prove efficient to bring the ulcer to a healing state and rescue the eye.”

The leucocytes in the easily removed necrosed parts of the *ulcus serpens* possess no phagocytic action on pneumococci—only fresh and undeteriorated leucocytes possess the power to take up pneumococci.

V. *The Lens.*

No opsonins could be found in the lens, even during the most intense inflammation of neighbouring parts.

Zur Nedden remarks in conclusion that the passage of opsonins into the non-vascular tissues of the eye follows definite laws, whose import in the healing of infectious processes cannot be mistaken.

J. JAMESON EVANS.

DOMEQ (Dijon). **Some Results of the Treatment of Progressive Myopia by Massage Pressure.** *La Clinique Ophtalmologique*, June, 1908.

THE author has applied this form of treatment in congenital

amblyopia, in advanced keratoconus, in certain forms of glaucoma and especially in progressive myopia.

He first gives an account of his technique. The operator should seat himself by the side of the patient, not facing him, as in this position his arms are not extended and the manipulation is therefore less fatiguing. Operator and patient each turn the head slightly so as to face each other.

The ball of the right thumb is placed on the closed lid of the left eye over the pupil. The tips of the other fingers rest upon the temple.

The left hand is similarly disposed with regard to the other eye.

Pressure is to be made in the direction of the optic axes, a result which will be obtained by pressing somewhat upwards as the pupil is always lowered.

Pressure should be slow and deep as if one wished to crush the globe. The arms of the operator should have no other support than the head of the patient, for with the longer leverage of the whole arm the massage is smoother than if the thumb alone made the movement.

The number of times pressure is applied should be on an average from 4 to 500: there can be no absolute rule either as to this or as to the force of the pressure. The immediate result should be an appreciable, but not marked, diminution of the intra-ocular tension. In eyes where the tension is already minus this result is quickly obtained and care must be exercised. In eyes with a normal tension the sitting should be longer and the compression more forcible to obtain the same result. As a general rule the 4 or 5 first massages should be very gentle and of short duration so as not to tire the eye but gradually to accustom it to the treatment, even though the diminution of tension may not be obtained in them. It is often helpful to put a drop of half per cent oily solution of eserine into eyes with a normal tension.

The first two series of massages, of 10 or 12 sittings each, should not be separated by an interval of more than 3 to 4 weeks.

In cases of "simple myopia" Domec no longer practises massage. Since massage never really diminishes the degree of myopia (the increased acuity of distant vision which it pro-

duces being always temporary) it appears to him to be useless in such cases. He merely orders correcting glasses.

Of the cases of *progressive myopia* in the growing period he cites five cases out of a large number at his disposal which had been under observation for several years. They show improvement visually, with arrest of the posterior staphyloma.

He always orders correcting glasses, although in some cases the full correction is not given at first. He considers absolute rest, except in the acute period, probably more harmful than useful, pointing out that in cases where binocular vision does not exist, the myopia develops more rapidly in the eye which is not used, and he advises the use of Rémy's diploscope to obtain binocular vision in these cases. Patients should when possible be seen at intervals of 2 to 3 months and their vision tested, when this is not possible their parents should from time to time ascertain that their distant vision is not deteriorating, for which purpose he suggests public clocks as a useful rough test. Should vision fail, or should any symptoms appear, such as fatigue at work, etc., a course of massage should at once be resorted to. He points out that the disease is not continuous but advances by successive attacks which are coincident with the choroidal changes.

Improvement is recorded in cases presenting perimacular and macular changes.

In cases with macular hæmorrhages the results are less favourable: he considers, however, that massage hastens the absorption of blood and improves the vitality of the choroid. He believes this treatment practised at the beginning of each progressive attack may prevent increase of the myopia. He states also that recurrences become less frequent after its use. To be efficacious there must be a distinct reduction of tension, the intra-ocular fluid being to some extent forced out of the eye. The renewing of this fluid takes several hours and he thinks stimulates nutrition. He speaks of a feeling of well being and tendency to sleep after massage, and looks upon this as possibly being a factor in the process of recovery.

No mention is made of the occurrence or non-occurrence of any untoward complications from this form of treatment.

J. F. CUNNINGHAM.

THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Thursday Evening, November 12th, 1908.

The President, MR. MARCUS GUNN, in the chair.

CARD SPECIMENS.

Linear Opacity of the Cornea following Birth Injury.—Mr. R. R. James.

Girl, aged 13. The vision in the right eye with correction was $\frac{6}{36}$, that of the left $\frac{6}{6}$. In the right cornea, situated at about the junction of the middle with the outer third, was seen a vertical band of opacity extending nearly across the cornea from above downward, and about 1 mm. broad. It occupied the deeper layers, though some parts of the band did not appear to be on the same plane as others. The history of the mother was that all her confinements had been difficult, and the present child, the last of 13, was delivered by forceps. The following day it was noticed that the right eye was swollen, and "the sight of the eye was like a bit of liver." It took six weeks for the eyeball to recover its normal appearance.

Specimen from a case of Iridocyclitis followed by perforation of the Sclerotic and Orbital Abscess.—Mr. A. L. Whitehead.

A female child, aged $4\frac{1}{2}$, came with a history of 6 weeks' illness, which began with headache, vomiting, high temperature, and delirium; after 3 weeks the left eye became painful and inflamed, and 2 weeks later proptosis manifested itself. Examination showed the eyelids swollen and oedematous, with marked proptosis of the eyeball, and in the outer part of the orbit a distinct mass could be felt. The cornea was hazy, the pupil dilated, and behind the lens could be seen a yellow mass filling up the posterior chamber. The orbital abscess was opened and the eye subsequently excised. The specimen showed a perforation of the sclerotic behind the ciliary region, and the posterior chamber full of purulent exudation; the retina was detached, and the choroid infiltrated. By microscopical examination the choroid was found thickened, with much exudate and some hæmorrhages.

Crateriform Hole in the Optic Disc.—Mr. Sydney Stephenson.

This was a typical case of the kind in a little girl of about 8 years of age.

Case of Posterior Cataract commencing subsequent to prolonged exposure to X-Rays.—Mr. Leslie Paton.

M. N., aged 32, female, had good sight in both eyes 6 years ago.

Since that time she had been under treatment for lupus of the cheek with X-rays. There had been 20 exposures on the right side and 18 exposures on the left. The tubes used were of the old-fashioned type, made of soda glass, and the eyes had been protected by rubber sheeting only. After each application there was slight swelling of the lids, and the eyes were occasionally bloodshot and felt gritty. The vision in June 1908 was reduced to counting fingers at about 1 metre in both eyes. In the posterior part of each lens was a dense greyish plaque, and several granular opacities were present in other parts. Cataract extraction was performed on the right eye, preceded by a preliminary iridectomy, and the vision afterwards with correction was $\frac{6}{6}$ and J1. A preliminary iridectomy has also been done on the left side.

In answer to questions, Mr. Paton said there was no evidence whatever of iridocyclitis in either eye.

Vascular Changes in Albuminuric Retinitis.—Mr. Angus MacNab.

This case, which on July 8th 1908 gave vision as $\frac{6}{6}$ with correction in both eyes, had sudden failure of sight in the left eye on August 22nd of the same year; and the fundus showed the typical picture of acute obstruction of the central artery of the retina. On September 5th there was retinitis, with exudation and hæmorrhage in the other eye. Albumen in the urine was discovered at the second visit, but this condition has now improved.

An examination of the left eye showed the inferior temporal artery just outside the disc to be opaque, and the same condition, though less marked, was present in the superior vessel.

Mr. MacNab considered this a case of arteriosclerosis producing thrombosis and plugging of the central artery of the retina.

Convergent Strabismus in a child 12 years old.—Mr. G. Brooksbank James.

This case had been treated in the usual way for 3 years with glasses and orthoptic exercises with no improvement. An advancement of the external rectus was then performed and perfect stereoscopic vision resulted. The same treatment was adopted in another case, where convergent strabismus had occurred following interstitial keratitis, and the same result as regards stereoscopic vision was obtained.

Acute Optic Neuritis in one eye, with changes at the Macula, in a girl without any evidence of constitutional disturbance.—Dr. Rayner Batten.

A.H., aged 16, came for treatment on October 22nd, 1908, on account of sudden failure of sight in the left eye. The patient was myopic, and with - 6 sphere in each eye, the vision was $\frac{6}{12}$ in the right and $\frac{6}{60}$ in

the left. In June 1908, the sight had been equally good in the two eyes. Examination, made on October 29th, showed optic neuritis in the left eye with 4D of swelling; there was also some œdema and a star-shaped figure at the macula. On November 9th the swelling was subsiding, so that the highest measurement was only 2D, and the vision had improved to $\frac{6}{36}$; a central scotoma for red and blue was present. No cause could be discovered to account for this condition.

PAPERS.

A case of Orbital Abscess following Retinal Embolism.—Mr. A. L. Whitehead.

Mary L., aged 42, came for advice on March 22nd, 1908. She was married and had five healthy children, the last 3 years ago; menstruation had ceased 12 months. On March 7th, 1908, she commenced to suffer from pain in the right shoulder with shivering and rise of temperature, lasting 10 days. On March 17th the right eye became dim and in a few hours was practically blind. Towards evening the eye became congested and painful, and in 3 days proptosis developed. Five days later this latter had increased considerably and there was some swelling of the orbital tissues behind the eyeball. The cornea was steamy, there was some iritis with hypopyon and the whole of the anterior chamber was hazy. Examination of the heart gave evidence of a systolic murmur, but no focus of suppuration could be found anywhere in the body. Incisions were made into the orbit and the fluid contents evacuated; the eyeball was then excised and pus was found escaping from a hole in the posterior and outer part of the sclerotic. Four days later an axillary abscess developed, which was opened, and healing took place rapidly. On April 25th the patient returned home, and the systolic murmur was much less marked.

Mr. Whitehead considered this to be a case of endogenous panophthalmitis of embolic origin, arising from the cardiac lesion, though he thought that even on this interpretation the orbital cellulitis with perforation was not common.

In the discussion on the bacteriology of the case, which followed, Mr. Whitehead remarked that the contents of the orbital abscess showed diplococci, but that no organism could be discovered in the pus from the axilla. There had been no examination of the blood made.

Nodular Opacity of the Cornea in three Generations.—Mr. Herbert H. Folker.

This paper was accompanied by 4 drawings, shown as lantern slides, and genealogical chart.

Harriet R., aged 21, married, has had defective sight as long as she can remember. She has been the subject of two attacks of inflammation, one 13 years ago, and the other last year, each attack being slight. She is one of 11 children, and at the present time has a baby 10 weeks old; she has also noticed that since her confinement her vision has been worse. She was found to have central greyish opacities in both eyes confined to the anterior layers of the substantia propria; some of them, being less dense in the centre, suggest funnel-shaped depressions; but the epithelial surface is quite smooth. There was no staining, and the vision in both eyes was $\frac{6}{18}$.

The character of this opacity being of the congenital nodular type led Mr. Folker to make enquiries into the family history, with the result that the genealogy was traced back to an old man of 92, who, with his wife, was still alive and had had 13 children. He himself had irregular white opacities occupying the central region of the cornea which were very dense; and the defect of vision resulting had been so great that iridectomies inwards had been performed in both eyes. He could only count fingers at 1 metre.

Seven other cases in this family were described, 4 male and 3 female, the eldest being 50 and the youngest 12. All showed opacities of the cornea occupying the central area only, and varying in density in different cases. The youngest members exhibited only a slight dotted appearance, but in the older ones the opacities were much thicker and in some the separate areas showed signs of coalescing into one mass.

From the above cases Mr. Folker deduced three points, viz. :—
1. That the condition is undoubtedly hereditary. 2. The absence of unevenness or elevation of the epithelium. 3. Presence of lattice work arrangement of lines in one case. The etiology is doubtful and has been ascribed to different causes by various observers. Groenouw considered the opacities as due to hyaline deposits, while Chevallereau found crystals of urate of soda; but Parsons is of opinion that some general agent is the origin of the corneal condition.

The questions which suggest themselves are whether there is a limit to the life of the disease, or whether it can wear itself out in succeeding generations, and what treatment is most advisable.

In the subsequent discussion on this paper Mr. Holmes Spicer spoke decidedly as to the progressive character of the disease, a view which was supported by Mr. Treacher Collins. Mr. MacNab put forward the suggestion of some tubercular diathesis being associated with this condition.

MALCOLM L. HEPBURN.

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